CHILTON'S 1/1983

AUTOMOTIVE INDUSTRIES

NORTH AMERICAN

1/12/83

C2150-3

FLEXIBLE

AUTOMOTIVE MANUFACTURING TAKES SHAPE

Chilton's
AUTOMOTIVE INDUSTRIES

January, 1983/Volume 163, Number 1

FEATURES

17 Flexible Automotive Manufacturing Takes Shape
"If it's Wednesday we must be building J-cars." Sound farfetched? The highly flexible production lines of the future could give car making the bustle of a whirlwind travelogue.

22 France Concentrates On Components
The latest revolution to hit France has the French government playing white knight to a fragmented components industry, with good results.

25 Volkswagen's Power Play
VWoA's response to tattered US sales includes a new man at the helm, a 50 mpg Rabbit and the *wunderwagen* GTI.

28 Ford Continues '83 Model Intros
Ford officially launches the '83¼ T-Bird/Cougar and drops some hints about the '84 Bronco II. Here's our latest at-the-wheel report.

30 'Economy' Valve Could Have Big Impact
Forget the Pogue carburetor. Here's a report on the newest fuel tickler which has Washington buzzing and Detroit cautiously interested. Initial tests show economy and torque up and all regulated emissions down.

33 Autofact 4—Computers Take Philadelphia!
The recent Autofact conference in Philly was crowded with CAD, CAM, CIM . . . and people and optimism.

34 Joining The Robot Circus—Now Or Never?
Is a robot really a plant managers best friend? Here are some tips to consider before taking the robotics plunge.

38 New Car Spotlight
In the spotlight this month are new models from Mercedes, Saab, Pontiac, Volvo, Toyota and Subaru.

NEWS & DEPARTMENTS

7 Editorial: Auto Wages—Everybody Loses
7 Editorial & Business Staffs
11 Newsline
12 Marketdata
41 Technical Literature
41 New Products
42 Business Managers/Ad Index

COVER

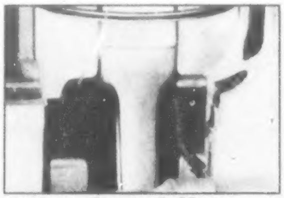
The US auto industry stands at the brink of a production warp which should increase plant flexibility.

NEXT MONTH

The 20th awarding of *AI's* Man of the Year goes to Chrysler's Lee Iacocca. Also—Quality: what, how and where?

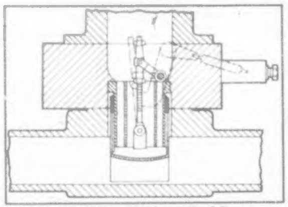
QUOTABLE

Borg-Warner's Thomas Hague, who spent 10 years as a supplier executive in Japan, describing the three-tier supplier industry there—"The only thing keeping it in gear is the terrible incremental apprehension that there might be a five minute delay in delivering the perfect product to that production line."

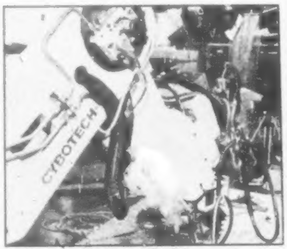


VW Turbo Diesel—P. 25

Ford Bronco II—P. 28



Webster-Heise Valve—P. 30



Cybotech Robot—P. 34

Saab 900 Turbo—P. 38

Colin Chapman—P. 11

AUTOMOTIVE INDUSTRIES (ISSN 0273-656x) magazine is published monthly by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: United States and US Possessions—$30.00 per year, $55.00 for 2 years; Canada and Foreign—$75.00 per year. Air rates on request. Single copies and back issues on request. All subscription orders must be accompanied by cash or check, along with complete information for classification, including the title of the individual and the product the company manufactures. Second-Class Postage Paid at Wayne, PA 19087 and additional mailing offices. POSTMASTER: Send address changes to AUTOMOTIVE INDUSTRIES, P.O. Box 2055, Radnor, PA 19089. ©Chilton Company, 1982. Permission to photocopy for internal use or the internal use of specific clients is granted by Chilton Company for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $1.00 per copy of the article, plus 25¢ per page is paid directly to the CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to The Editor. (0273-656x/83 $1.00 + 25¢)

"Some day, these will be common in the industry. Today, they are rare. Detroit Gear and Axle has one going in, we know of a couple in Italy, and that's about it," Streng adds.

"These are extremely expensive systems, and they are only suited to the medium-volume level."

The question becomes cost versus benefits. Some of these flexible machining systems cost five to six times as much as hard tooling. A company could almost afford to buy and re-buy hard tooling a few times. "What we have to do is work to get the cost of these systems down," says Streng, "then the improved machine utilization they offer would be a factor in favor of the FMS."

Newer, more flexible solutions are also available for higher volume parts. These are the flexible transfer lines. They deal with more of a batch/random process than do typical FMS, and with smaller families of parts.

"Even though the automotive industry has changed tremendously, it still needs relatively high volumes of parts," says Cross's Bastow. "You may not see them running 200 an hour of the same V-8 engine for two or three shifts all year like they did 10 years ago, but you will see them running threes, fours and sixes in blocks or heads down the same type of equipment.

"And, when they're running a given size, they are running it at 120 or 150 per hour. This is what a truly flexible transfer system can do."

In the past, it was not uncommon for transfer lines to run a couple of different parts, but typically the changeover was of a manual nature and was made on a planned schedule. Because of the flexibility now built into these lines, changeover can be done with very little manual labor.

"With numerically controlled stations, instead of changing heads or changing tools manually, we can index a new one into position or we can change tools with a tool changer. And, we can control all that through the microprocessor," says Bastow.

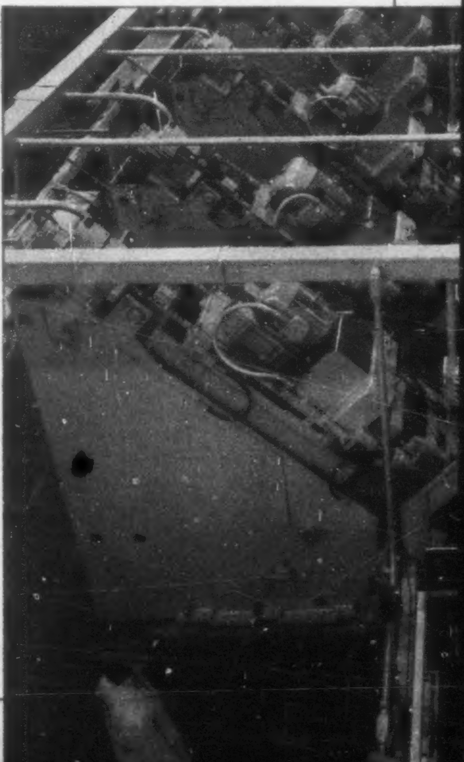
Cross has just shipped a line that can handle three-, four- and six-cylinder diesel engine blocks in a variety of batches. It is equipped with a monitor which tells which part the line is running. It can even be running four-cylinder models on the end of the line while three-cylinder parts are entering the system. That's flexibility!

This particular system has been installed at Consolidated Diesel to make diesel engines for small trucks and farm vehicles. Electronic monitors at each Cross machine on the line and on other equipment communicate to the system monitor controller to provide up-to-the-minute information about tool change schedules and fault conditions by machine. This allows management to make timely, informed assessments of system conditions.

The monitoring system, called Sentry III, utilizes a network of Modicon programmable controllers communicating through a Modbus industrial communication system. It is easily expandable to keep up with changing production parameters.

Another transfer line development from Cross Co. is called Flexcycle. With this control system, only those machining units of a transfer line with parts present at their stations will cycle. When the controlling unit is not required to cycle, total machine cycle time is reduced and throughput can be increased.

"Flexible manufacturing will be a major element in automotive," says Chet Maccio, vice president of sales



A synchronous free-part lift and carry machine from Cross Co. drills the banks of heavy cast-iron V8 diesel blocks.

US Vs. Japanese Assembly Productivity

Since 1978 the US auto industry has been involved in the most massive revamping in its peace-time history.

Old, multi-story factories have been closed and replaced with sprawling, robotized complexes that are chock full of computerized machine tools and test equipment. Many industrialists have predicted that these brand new plants will allow the American auto industry to regain its historical productivity edge.

But a comparison between the most modern assembly plants in the US and Japan suggests that this may not be the case. Indeed, the facts suggest the Japanese are actually increasing their productivity advantage.

The basis for this assumption is a comparison of GM's Hamtramck assembly plant, which is expected to start building the E-body fwd luxury cars (Olds Toronado, Buick Riviera, Cadillac Seville and Eldorado) in the fall of 1985, and Toyo Kogyo's Hofu City plant. TK's plant started building the fwd model 626 last fall.

Assembly plants were chosen for the comparison because they generally perform the same operations, that is to say that they assemble roughly equivalent amounts of components.

It should also be noted that both plants use the same number of robots, about 155, and that all the Hofu City figures include an on-site stamping plant. GM's nearest stamping plant to Hamtramck is in Grand Rapids, MI—200 mi (322 km) away.

Toyo Kogyo is able to build a smaller plant by eliminating all warehouses and using a kanban system of inventory control. Seats and windshields are delivered every 30 minutes; mid-size parts are delivered from one to eight times a day; and only a two-hour supply of engines are kept on hand.

In addition, TK's die change time is 5 minutes, with a goal of 3 minutes. As a result of these and other efficiencies, Toyo Kogyo requires less than half the man hours of labor to assemble an automobile.

One thing that must be kept in mind is that the investment, employment and capacity levels cited for GM's Hamtramck plant are pre-

GM's & TK's Assembly Compared

	GM Hamtramck (Detroit)	TK Hofu City (Hiroshima)
size	3.2 million ft² (297,600 m²)	1.5 million ft² (139,500 m²)
investment	$600 million	$150-180 million (35,000 million yen)
employment (direct & indirect)	6000	1800 (including stamping plant)
capacity	1120 cars/day	1000 cars/day (not including 350 CKD units/day)
productivity*	42.8 hours/car (40 hours/car assuming 5% absenteeism	14.4 hours/car

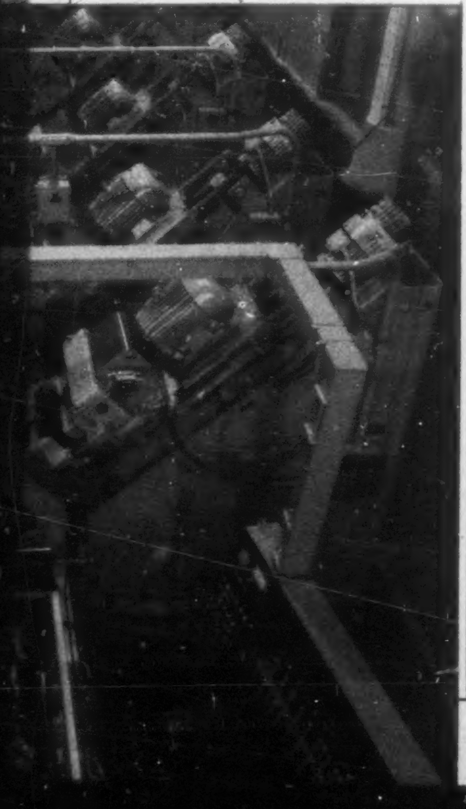
**Productivity, or man-hours of labor per car, is determined by multiplying total employment by 8 hours to get total man-hours per day. This figure is then divided by total production per day.*

liminary and could change in the future. Also, the GM luxury cars will be more complex and will require more components. In addition, the city of Hamtramck is preparing an industrial park that will help suppliers deliver components on a just-in-time basis.

Nonetheless, it would appear that Japan's newest assembly plant is more than twice as efficient. ■

—John McElroy

for Snyder Corp. "Because automotive can't afford to make these extremely costly model changes or capital expenditures. They are going to be more conscious of being able to re-use the equipment they buy today and of having the ability to run a family of parts.



"We have been involved in several quotations to automotive where we have proposed flexible manufacturing systems both independently and in conjunction with our corporate manufacturing group, the Giddings & Lewis [G&L] organization," says Maccio.

An example is a machining system which would accommodate two different size manifolds for two different size engines with a minimum amount of retooling.

"We would take an intake manifold transfer machine," Maccio explains, "then incorporate a control, then Gilman-type transporting equipment [Gilman is also part of G&L], and then Snyder-type machining units, and marry that together to form a machining complex for intake manifolds.

"We could add a machining center if it is required, with tool change characteristics, automatic gaging, automation part probing, identification, etc. We are in a unique position in that we can provide all this technology from one corporation," says Maccio.

Maccio sees flexible manufacturing systems as less suitable for engine blocks and cylinder heads than for manifolds which can change yearly because of Government regulations for pollution control or for service parts over a long period.

G&L has four systems going in off-highway and power transmission applications. And the GM Tech Center is aggressively looking at this technology, says Maccio. But, in these economic times, when people are reducing their expenditures, it is difficult to sell technology.

"We are involved in some minor retooling now where our equipment will make engine parts more effective and less expensive," he adds.

Automakers concur in the need for flexibility. "We think that flexibility is important and will become more important as time goes on, because it is becoming obvious that we are going to need to respond more quickly to shifts in market demands," says Paul Ayres, director of production engineering at Cadillac. "In order to respond, we will have to be as flexible as possible in our assembly facilities as well as in our manufacturing facilities."

The equipment changes are probably most profound in assembly in the body in white area. That is where Cadillac anticipates the greatest changes as major model changes occur.

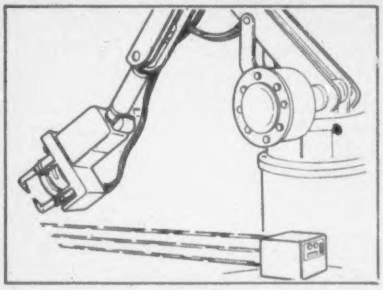
"In cooperation with Fisher Body, we have developed a series of plans for flexible automated body shops. And as we undergo major model changes year by year, we plan to install these flexible facilities," says Ayres.

These plans rely heavily on the ability to change fixturing which is dedicated to the particular style or model relatively quickly. They will include flexible welding with robots so that changeovers become a matter of reprogramming rather than physically changing a great deal of tooling. The Robogate system currently installed in Janesville is an example of flexibility which will reap paybacks over the coming years.

Changes are underway now. Janesville is an example. The Orion plant and the Wentzville plant, now under construction, will continue the trend.

(Continued)

JOINING THE ROBOT CIRCUS



NOW OR NEVER ???????

Your multi-million dollar automation scheme fell sour and now you have a tribe of rogue robots either self-destructing around you or trying to weld the foreman's pants to his shoes every other millisecond. What went wrong? Here are some tips.

While US manufacturers in general and automakers in particular are caught up in a mad wind sprint toward robotics, quite a few runners are stumbling due to inadequate preparation and lack of organization.

How can the fledgling robot user determine how much he actually needs a robot system and what guidelines should be followed in developing, installing and implementing the system that is to be adopted?

The following, drawn up by William Finch, executive director of advanced manufacturing technologies for The Princeton Group Inc., Princeton, NJ, are a number of considerations to be taken into account before your company joins the robotics circus.

- Don't jump headfirst into robotics just because without them you feel the world is passing you by. Robots may not be a proper fit with your needs. Ask what your real interest is—to have a robot as a symbol of the "progressive-mindedness" of your company, or do you want a practical automated system, one that serves you well, while the equipment that it involves remains an important but very secondary consideration.
- Don't commit yourself to a selection of equipment and then find an application to fit it.
- Don't think all you have to do is underwrite the cost of a robotic installation and then assume that the rest of the problem will take care of itself. Consider, if you were to improve the construction of a new plant, you would certainly recognize the parallel responsibilities for resolving all present and future needs attendant on such an important step.
- Don't think that a robot is a magical machine that will eliminate all your production problems. A robot is only a tool that must be used as exactly that and not as an end in itself.
- Don't put your manufacturing manager in the position of having to be an expert in the selection of a robot installation just because the plant has resorted to him in the past. In self-defense he may end up having to rely

Big Squeeze Hits Robot Market

In the past two years anything marked robotic drew interest and opened corporate pocketbooks. But the big squeeze has hit. The luxury of spending capital on robots has ground to a halt.

Ransburg Corp.'s performance on the New York Stock Exchange provides a good example of the roller coaster robot market the last two years.

Ransburg's stock value tripled almost immediately after it formed a joint venture with Renault in 1980 called Cybotech Corp. Now its stock value has dropped even though Ransburg's chairman, Don Kacek, says the long-term market potential looks bright.

"The long-term outlook is good" says Kacek. "But when you have very restricted capital expendi-

Ransburg Corp. chairman, Don Kacek, left, watches a company engineer put a Cybotech welding robot through its paces. Ransburg and Renault formed Cybotech in 1980.

tures, you tend to buy only those things that are absolutely necessary. You have to buy the things necessary to keep the plant moving, but that certainly doesn't include robots. As a result, the robot business has been hit harder than the general capital equipment business."

There are still companies, however, that have been drawn to robots because of their glamour. Sometimes you have to turn down those companies even though it could mean thousands of dollars in Ransburg's kitty, according to Kacek.

Kacek emphasizes that the companies which buy robots to keep up with the competition often don't know where or how to use them. This eventually turns a happy customer into an angry purchaser.

In addition, Kacek says, "The automotive industry has bought a lot of equipment from the big robot suppliers earlier. And it's our understanding that some of that equipment hasn't even been put into service yet." ■—*Michael K. McCann*

Robot Growth

Robots In Use (units)

ITEM	1972	1977	1980	1985	1990	1995
Coating	60	300	750	4400	17000	40000
Welding	415	1100	1820	8000	28000	65000
Spot Welding	415	1050	1700	4800	11000	24000
Arc Welding	—	50	120	3200	17000	41000
Material Handling	360	790	1795	12100	42600	113000
Pick-and-Place	200	325	880	3900	14000	40000
Palletizing	40	140	240	1200	4600	18000
Machine Loading	120	325	675	7000	24000	55000
Processing	80	260	728	5700	27000	97000
Parts Finishing	80	230	530	3000	11000	35000
Assembly	—	30	180	2300	13000	50000
Inspection	—	—	18	400	3000	12000
Total Sales	**915**	**2450**	**5093**	**30200**	**114600**	**315000**

Source: Predicasts, Inc.; Cleveland, Ohio 8/82

According to a report developed by Predicasts Inc., there will be 315,000 robots in American industry by 1995. The report estimates that robotic industry sales will increase from $89 million in 1980 to $600 million in 1985 and to $4 billion in 1995.

too much on the machine tool manufacturer whose machines he has used up to now. Your machine tool manufacturer's equipment may not represent the best possible choice.

- Don't believe everything the robot manufacturer's salesman tells you. You know more about your business than anyone, so don't rely on him totally for application engineering and installation.
- Don't blame the robot for every problem that arises with the new system. The equipment with which the robot interfaces may be the culprit.
- Don't expect vendors to furnish turnkey implementations. You're looking for an integrated robot system that will interface with your other machines. Since you know more about your plant than the vendor does, you must be just as reponsible as the vendor for the implementation.
- Don't forget people requirements. The robot may displace the machine operator, but people are needed to program and maintain the robots.

The list of considerations Finch says you should make are as follows.

- Recognize that a vastly improved automated factory system involving costly and complicated equipment must have appropriate direction by and policy guidance from the top. This involvement is needed to reflect an adequate understanding of the total needs of corporate, divisional and/or functional executives.
- Recognize that without proper planning and the time and money that this requires, your new systems will inevitably fall short of their original objectives and promises.
- Identify the application first and then, and only then, determine the type of equipment needed to operate it effectively.
- Ideally, start implementing robots in environmentally hostile areas, such as where you have experienced Workmen's Compensation cases or have received OSHA citations.
- Keep it simple. Start with the simplest applications where the risk of failure is lowest, even if the return on investment is not as promising as that projected on more sophisticated ones. You want a success upon which to build.
- Have your own people participate in the development of the system where their contributions can be worthwhile. As participants they will not only accept the many changes that will be necessary, but they will also be informed to the point of knowing how to work with the robot system once it has been installed and is operating.
- Think carefully about the manner in which your plant is to be organized. In time your operations will be largely run with robots which will have displaced much of your human labor force. Will you need the layers of plant management and foremen that you now have? ■

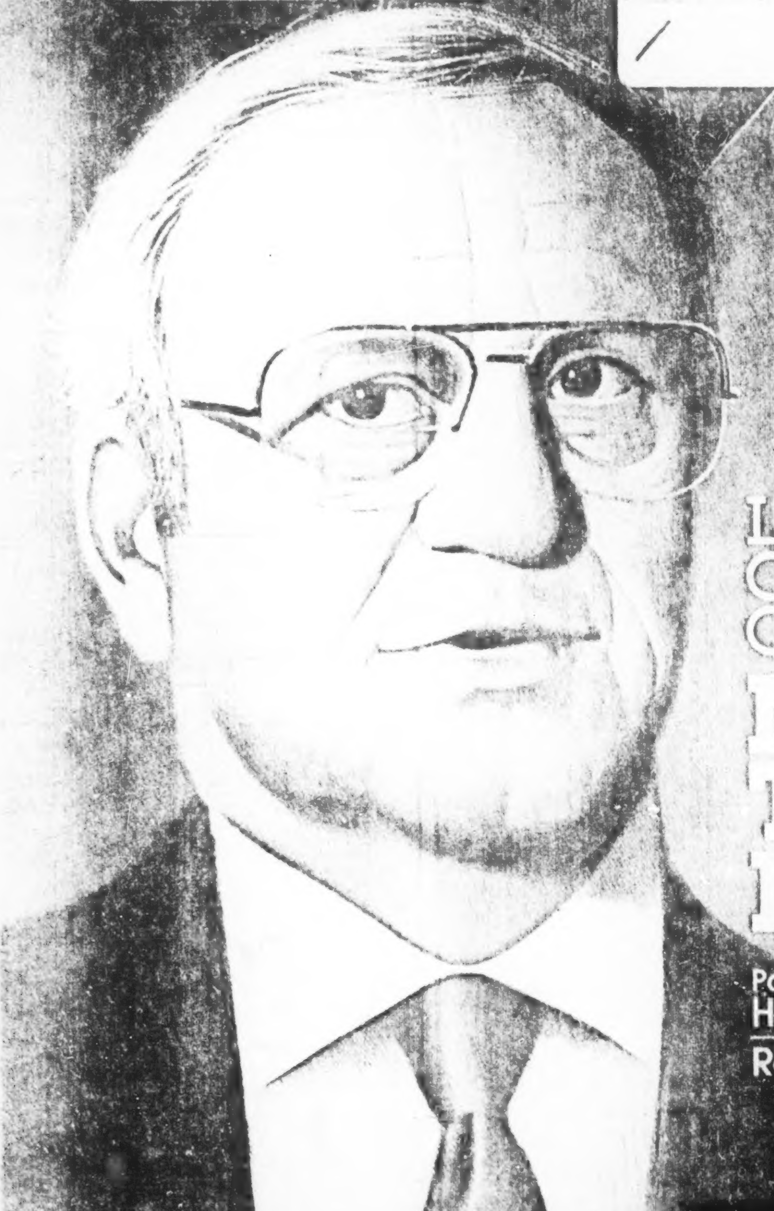
Single copies of this article are free. Circle 507 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

CHILTON'S 2/1983

AUTOMOTIV INDUSTRIES
NORTH AMERICAN

Special Supplement
British Automotive Technology

1 C2150-3



Lee A. Iacocca
Chairman
Chrysler Corp.

Man Of The Year 1983

Part I of III
How To Measure Quality

Robots Spark TK's Output

Chilton's
AUTOMOTIVE INDUSTRIES

February, 1983/Volume 163, Number 2

FEATURES

12 Robots Spark TK's Output
Toyo Kogyo's Hofu City plant uses robots to good effect in building the new Mazda 626.

14 Quality—The Glittering Prize
The first in a series of reports on the steps US automakers are taking to make "made in America" once again the benchmark of quality.

17 '83 SAE Congress—Getting Engineered Productivity In Gear
An overview of the upcoming SAE Congress in Detroit and what it means in terms of productivity.

18 Man Of The Year
AI salutes its 1983 Man Of The Year, Chrysler chairman Lee A. Iacocca.

23 Ford And Mazda Debut Fwd Compacts
A look at Ford's new Tempo/Topaz and a chat with Toyo Kogyo's Michinori Yamanouchi on Mazda's new fwd 626.

25 '84 Corvette Sets The Trend
If George Orwell could have driven the new Corvette, he might have had fewer doubts about 1984.

26 OEM Cooperation Keys Bumper Production
A look at how one European vehicle manufacturer is forming closer ties with its suppliers.

27 NMTBA Reports Trends
A National Machine Tool Builders' Assoc. survey shows the growing importance of computer assistance in NC part programming.

16/17 Special British Supplement

NEWS & DEPARTMENTS

4 Editorial: A Tribute To Chrysler
4 Editorial & Business Staffs
5 Newsline
7 Marketdata
10 News/Analysis: Nissan Marches Toward Aluminum
28 New Car Spotlight
28C, *I-28A* New Product Showcase
28E Technical Literature
I-28C New Patents
29 Trendsetters
30 Business Managers
30C, *I-28D* Ad Index
31 Reader Information Cards

** Certain editorial items appear only in the North American edition, or in the International edition.*

COVER

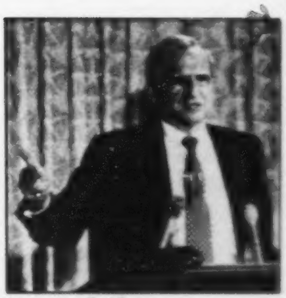
Chrysler chairman Lee A. Iacocca, *AI's* Career Achievement winner for 1983.

NEXT MONTH

Materials, Quality: Part II, and *AI's* Roominess Index highlight the March issue.

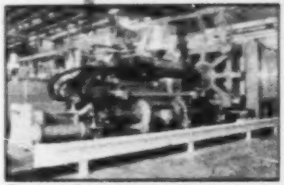
QUOTABLE

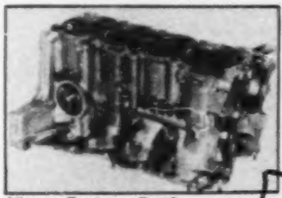
"Gains will look big for us next year only because we will be lifting off from Ground Zero in 1982."—US metalworking industry executive.


Iacocca—P. 18

Hofu City—P. 12

'84 Corvette—P. 25


Bumper Production—P. 26


Nissan Engine—P. 10

Peugeot 505STI—P. 29

AUTOMOTIVE INDUSTRIES (ISSN 0273-656x) magazine is published monthly by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: United States and US Possessions—$30.00 per year, $55.00 for 2 years; Canada and Foreign—$75.00 per year. Air rates on request. Single copies and back issues on request. All subscription orders must be accompanied by cash or check, along with complete information for classification, including the title of the individual and the product the company manufactures. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. POSTMASTER: Send address changes to AUTOMOTIVE INDUSTRIES, P.O. Box 2055, Radnor, PA 19089. ©Chilton Company, 1983. Permission to photocopy for internal use or the internal use of specific clients is granted by Chilton Company for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $1.00 per copy of the article, plus 25¢ per page is paid directly to the CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to The Editor. (0273-656x/83 $1.00 + 25¢)

AI Marketdata

Car/Truck Sales To Climb 16%

The Commerce Dept.'s "1983 Industrial Outlook" indicates car and truck sales in the US will reach 12.1 million units this year, 16% above 1982. Domestic production is projected at 9.3 million units, a 31% increase over last year. Domestic car sales could increase 19% to 6.8 million units and imports 9% to 2.4 million units, the latter figure based on the assumption that Japan will continue its import restraints through March 1984. Projections are based on a hoped for moderate decline in interest rates. By 1987, the Outlook predicts car sales could reach 7.9 million domestic units and 3.4 million import units.

Who's On First

According to a report by Paine Webber Mitchell Hutchins Inc., 1983 domestic auto market shares will be: GM 60.7%; Ford 23.7%; Chrysler 11.3%; AMC 2.5%; VWoA 1.3% and Honda 0.5%. The chart below gives domestic model mix trends through 1983.

	Subcompacts	**Compacts**	**Intermediates**	**Full Size**
1978	13.0%	23.9%	32.3%	29.2%
1979	21.2	23.3	28.0	26.3
1980	25.4	25.5	27.9	21.2
1981	26.8	27.0	25.5	20.7
1982*	24.3	22.7	26.8	26.2
1983E	23.5	22.0	27.5	27.0

* through Nov. E—Estimate Source: Paine Webber Mitchell Hutchins Inc.

Nissan, Toyota Projections

Toyota expects to produce 3% more vehicles this year than last, a total of 3.25 million. Home market sales, according to the company, will rise 5% to 1.6 million units. Exports are expected to dip 1% to 1.65 million. Nissan estimates its '83 domestic passenger car sales will total 882,000, up 7.8% from '82, and domestic sales of commercial vehicles will reach 302,000 units, up 5.3% from '82. Total domestic sales should be 1.184 million units, up 7.1% from last year. Nissan exports should be 1.368 million units in '83, and vehicle production in '83 should reach 2.552 million vehicles, up 6.1% from last year.

'83 R&D

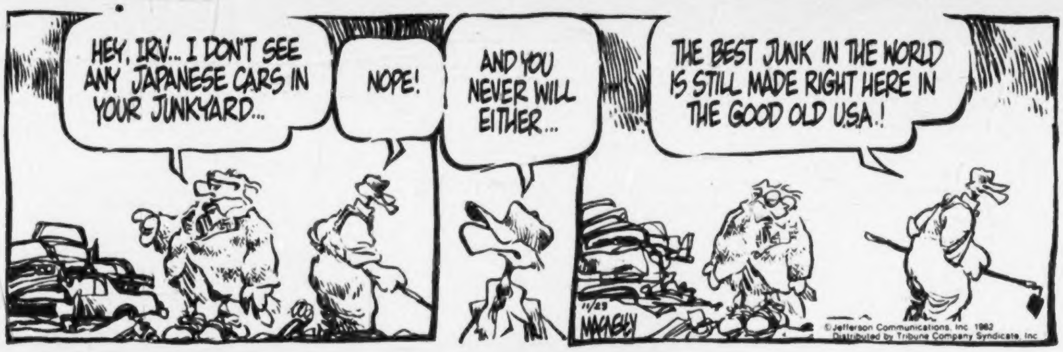
Research and development for autos, trucks and parts and other transportation equipment will reach $7.19 billion in 1983, according to a forecast by Battelle's Columbus Div. Of this figure, 85.6% will be industrially funded, leaving $1.037 billion to come from the federal government. R&D growth will be about 15% above 1982 levels, projected at $6.27 billion. In 1981, $5.41 billion was spent, and in 1980, $4.84 billion. "As with any other industry, the plans for future R&D depend on sales in preceding years," a Battelle spokesman says. "An awful lot of R&D is going into cars lately, mainly as a reaction to imports and gasoline costs."

CE Exports Drop 33%

Construction equipment exports for the first nine months of 1982 plunged to $3.2 billion, down 33% below the same period in '81, according to the Construction Industry Manufacturers Association. American manufacturers shipped 83,380 pieces of CE and related components to 149 foreign nations during the first nine months of '82. During the same period in '81, 99,799 pieces were shipped. Leading purchaser Canada bought 45% less equipment during the nine month period in '82 than in '81, or a total of $425.8 million. Number two purchaser Mexico bought 60% less in '82, or a total of $209.5 million. Third-ranked Australia declined 30% to $234.3 million in the first three quarters of '82.

Exec. Recruiter Sees Late '83 Turnaround

Alan Schonberg, president of Management Recruiters International, the nation's largest executive search company, says we've probably seen the worst of Black Tuesday blues. Schonberg says there's a chance for a "meaningful" second quarter '83 recovery. More likely, however, is a third quarter turnaround which should pick up considerably in the last three months of '83 and lead to a dynamite 1984. Schonberg bases his predictions on information received from his company's 400+ offices nationwide.


HEY, IRV... I DON'T SEE ANY JAPANESE CARS IN YOUR JUNKYARD...
NOPE!
AND YOU NEVER WILL EITHER...
THE BEST JUNK IN THE WORLD IS STILL MADE RIGHT HERE IN THE GOOD OLD USA.!
11/23
MACNELLY
© Jefferson Communications, Inc 1982
Distributed by Tribune Company Syndicate, Inc

This sour view of the US auto industry is fairly wide spread in the general media. (Reprinted by permission of Tribune Company Syndicate.)

QUALITY
THE GLITTERING PRIZE

Quality is, as John McElroy discovers, a many splendored thing. In this first of a series on that elusive word, AI delves into the what, where and how of quality, and the steps US car makers are taking to make the word once again synonymous with the land of the free and the home of the brave.

by John McElroy

Not long ago, American cars were considered among the best in the world. Today, imports are usually considered better.

To Mr. and Mrs. America, US car companies are a prime example of a dying smokestack industry—one that has lost its leadership in innovation, productivity and quality. The captains of industry will argue that it's not that bad, but some of them concede they lag behind their foreign competition.

And the result has been an ever-eroding market share in which one out of every three new cars sold is an import.

Recognizing they must retake the initiative, American automotive manufacturers have embarked on a radically different course to improve quality and productivity. These efforts are going to have a dramatic impact on their suppliers, the hourly workforce and their dealer networks. In some cases it will result in the organizational restructuring of the corporations themselves.

What Went Wrong?

A decade ago American manufacturers didn't recognize that they had quality problems—neither did their customers. Did the cars get worse or did the customers get picky?

One possible explanation relates to the inventory levels the domestic manufacturers carry. Excess inventory can lead to quality problems, basically because it hides mistakes. A quality problem may not be detected until a warehouse is brimming with bad parts (see "Making Just-In-Time Production Pay Off," Feb. '82).

During the 1970s inventory levels ballooned. This was partly due to a growing complexity of parts added for power options and emission controls. Part of it was due to a growing number of dedicated and obsolete plants and equipment. The rest resulted from the sales slump of 1974 and 1979.

Conversely, as inventory levels swelled in the US, they shrank in Japan. And this happened at the same time the public began to notice the Japanese cars offered better quality.

These facts notwithstanding, the quality experts at US firms don't believe the quality of American cars declined. Rather, they feel today's quality problems relate to consumerism, competition and the history of product development.

"The American public has become more quality conscious in everything it buys," says Larry Moore, director of product quality for Ford's manufacturing staff. "It's part of the consumerism we see. The consumer is becoming less and less tolerant of repairs, returns and marginal performance."

And George Butts, Chrysler's vice president of quality and productivity, says this growing consumerism relates directly to today's higher car prices.

"The trend to more value for the dollar was heavily stimulated by pricing," he says. "If you could buy cars and throw them away like kleenex tissues, then maybe you wouldn't be so fussy. But when it costs $8000 to $10,000 then you want the best value for your dollar."

At General Motors, Robert Decker, vice president for quality and reliability, agrees that economic forces helped place a greater emphasis on quality, but he believes Japanese competition really triggered it.

"It's foreign competition that has changed the public's priority," he notes, "and even ours. We were better than all our domestic competition; we were selling everything we could build and were making lots of money. So why change success? If it hadn't been for the Japanese, we wouldn't have changed as much or as quickly."

Yet, Phillippe Ventre, AMC's vice president of quality and product integrity, espouses a much broader and philosophical view.

"Quality is more important in the minds of the consumer today because this is the natural phase in the historical development of any product," says Ventre.

He explains that in the first, or development phase, the public is excited by a new product. To succeed, all it has to do is work. For example, in the automobile's infancy, it didn't matter if it required a hand crank or was noisy and dirty. Likewise, when television first appeared it didn't matter if it had a tiny, static filled screen.

"None of these problems matter," says

Ventre, "as long as the product works."

The second phase is what he calls the manufacturing phase. At this point competition forces improvements that provide the customer with a greater selection of products with special features, exemplified by chrome and tail fins on automobiles and color TV.

The last phase is a maturing phase in which the customer expects certain "givens" such as high fuel economy, good performance and top quality. And these expectations must be met with every product, day after day, and week after week.

Ventre believes US auto manufacturers were late in fulfilling the customer's expectations in the mature market. "It is a big mistake to say the Japanese targeted the US market as an area they should collectively take over," says Ventre. "They just happened to be in the right place at the right time with the right products."

If American manufacturers can meet the expectations of the customer in this natural phase of product development, he notes, it can regain its competitiveness.

Total Quality Control

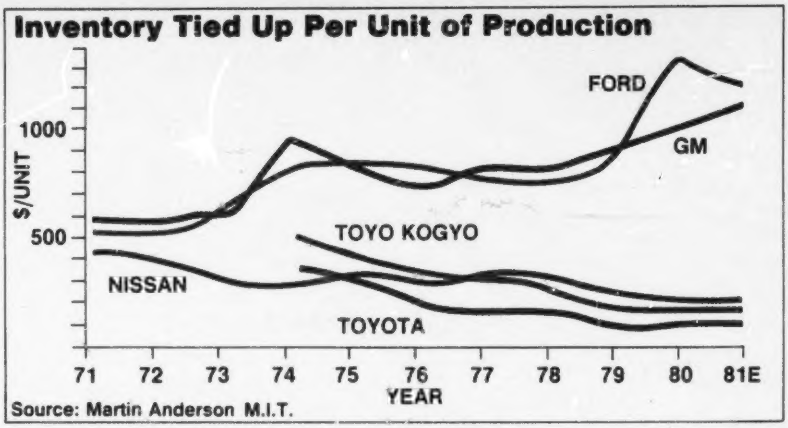
According to these quality experts, regaining the competitive edge will require a major philosophical change in order to achieve consistently high quality levels. Quality can only result from total planning at the inception of a new project. This includes coordination among research, design, manufacturing, purchasing and service. No one group can do this on their own; they must be fully integrated.

Previously, quality control was not involved at the early stages of development, and neither was manufacturing. It was not unusual to end up with parts and components that didn't work together or to spend a year in production before the bugs were worked out of a car.

"You must not have a baton system," admonishes GM's Decker, "where the design people hand off drawings to the manufacturing people and go on to do something else.

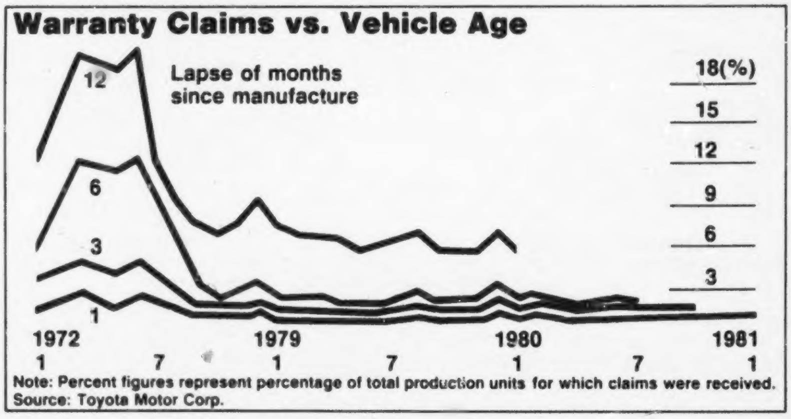
"To do a better job of solving problems up front we now have product development teams which are responsible for a component or a whole car from the concept stage to the in-use stage. And we have review points to check for quality, reliability and durability at every stage."

GM recently merged its Advanced Product Engineering and Advanced Manufacturing staffs at the Tech Center in Warren, MI to iron out problems early in the design stages. But GM still faces the difficulty of coordinating many divisions, each with a multitude of overlapping staffs.


Inventory Tied Up Per Unit of Production

Source: Martin Anderson M.I.T.

With kanban and just-in-time production, Japanese automakers were able to lower their inventory levels, which helped them improve their quality.


Warranty Claims vs. Vehicle Age

Note: Percent figures represent percentage of total production units for which claims were received.
Source: Toyota Motor Corp.

A good measure of efforts to improve quality can be seen in warranty costs. Toyota's warranty claims have steadily dropped throughout the last decade.

Ford recently moved its engineering, research and manufacturing under one command—Technical Staffs, headed by executive vice president Louis R. Ross.

At AMC, a special Quality Control Staff serves as the coordinating committee for all groups in the corporation. There are weekly meetings at the vice presidential level for all groups to coordinate their efforts on a project. The QC Staff will conduct tests at all stages of development to determine where there are problems and how to bring them to the attention of the groups which can solve them.

"It is like many small rivers that converge to form one large river," says Ventre.

Chrysler's working on a similar tributary system.

"We've busted the car into 18 big chunks, such as the engine, transmission, paint system, body alignments and so on," explains George Butts. "We have chosen the company's top experts in each of these areas to be chairman of that section. These chairmen report to a vice president who has the responsibility for four or five of those sections. Those people have been given the responsibility not only for day-to-day problems, but to project themselves into new products that will be coming three years from now so we don't make the same mistake twice.

"They're responsible for setting future quality targets, and when they're not making those targets, they have to go to the top committee on quality and explain what they're going to do about it."

The 'Total' Supplier

"When you talk about getting all disciplines involved in the earliest stages of design, a major element is engaging the designers with the suppliers and understanding their needs and limitations," says Ford's Larry Moore . . . which may be easier said than done.

According to AMC's Ventre, it is harder to work with the US supplier network than with European suppliers. Over there,

(Continued)

says Ventre, the suppliers are in on the development of a component.

"Here," he complains, "they get a blueprint, then quote the part and wait for a yes or no. You can't build quality in at this point. It must be designed in."

However, Ventre points out that the major suppliers understand the new change in philosophy and have adapted well on the Alliance program.

Chrysler expects to expect more from its suppliers.

"I think the day is coming when we're going to get the engineering and processing done by the suppliers," says Butts. "On a lot of parts they have the expertise, not us. There's no sense in doing a design, getting it way down the road and then turning it over to the supplier who has to change it to be able to build it. That's unproductive."

GM has established a Supplier Quality Index that rates its suppliers on a numerical basis. And Ford has a preferred supplier list through which contracts are signed with suppliers which have consistently better quality and delivery times, even though their prices might be higher. And the trend is toward fewer suppliers with longer term contracts.

"You've heard a lot of talk about having less suppliers," says GM's Decker. "Well, I don't think we're going to go out and advertise that we've eliminated this supplier or that. I think some suppliers eliminate themselves. Some of them won't do a good enough job, they won't be asked to bid anymore and they'll fall by the wayside."

Competing For Quality

In Japan, competition and recognition are used to promote and improve quality. Toyota, which first won the Deming Award in 1961, has started an in-house contest for its suppliers, which is divided into two categories—the Excellence Award and the Superiority Award.

The Excellence Award covers three areas: promoting company policy, eliminating and preventing defects, and lowering cost.

The Superiority Award is for those who have already won the Excellence Award. In addition, it covers the content of medium and long-term planning, and the goals and progress of technical development, including production engineering.

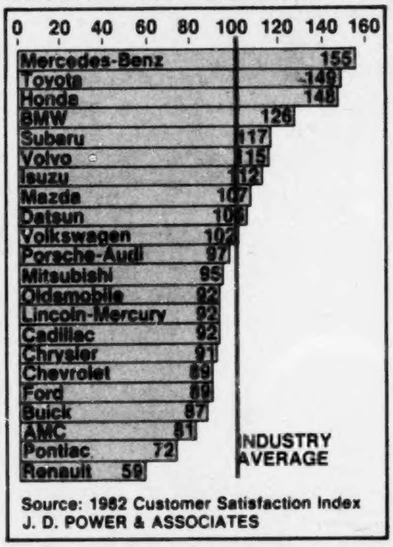
Considering Toyota's success, there are many US quality experts who believe an award system could be an excellent way to encourage American suppliers to improve their quality.

German Inspection Ranks Quality

Rank	Make	Trouble Ratio
1.	Audi	3.7
2.	Mazda	4.3
3.	Mercedes-Benz	5.5
	Toyota	5.5
5.	Honda	5.6
6.	Opel	5.7
7.	Volvo	5.9
8.	Porsche	6.4
9.	Nissan	6.6
10.	Mitsubishi	7.2

The results of W. Germany's mandatory auto inspection program suggest that Japanese automobiles are as good as Europe's best. The trouble ratio measures the number of vehicles inspected that had to be rechecked due to serious repair problems.

The Highest & Lowest In Customer Satisfaction



Source: 1982 Customer Satisfaction Index
J. D. POWER & ASSOCIATES

The customer satisfaction index rates models according to many factors, such as problems on delivery, and overall standards of repair service. While less than half of the domestic models are problem-free at delivery, two thirds of the Japanese cars are trouble-free. European manufacturers succeed in satisfying their customers through above average after sales service.

Sales & Service: Weak Link?

Quality can be measured in many ways. But the most important impact on the customer's perception of quality may be the quality of dealer service.

According to a J.D. Power survey, 41% of owners of domestic models must return their cars to the dealer two or more times because a problem is not fixed right the first time. For Honda and Toyota it is 25% and 28%, respectively.

Hopefully, this problem will begin to decline with the programs the industry is putting in place.

"We have a dealer service quality index, based on a questionnaire sent to car owners after a year," explains GM's Decker. "We can tell you the 10 best dealers in the country and the 10 worst, or the best and worst in each car division, or by region or by zone manager.

"You can really isolate the bad ones and work on them to improve. If they don't improve, then you have to tell them their dealershps are in some jeopardy."

To involve service in its Product Integrity program at AMC, the QC Staff went through shop manuals as they were being written, instead of waiting until they were printed. Then they made sure that AMC mechanics were trained to service the Alliance before it ever made it to the dealerships.

As an early warning device to monitor potential problems developing in the field, AMC has 40 dealers (representing about 15% of sales) which report daily on any and all problems with the Alliance. "Sometimes we can tell our dealers of a potential problem and the way to fix it, even before the dealer ever sees it," says Ventre.

Chrysler has just instituted a formal quality program with its dealers. Starting in January, Chrysler began auditing dealers to see how capable they are at servicing engines.

"We've brought together the complete engineering of how you should diagnose a driveability problem on an engine and sent training films to the dealers," explains Butts. "So now we're out there auditing to find out if the mechanic is really using it, and to find out if it's useful."

What is potentially the most interesting development at the dealer level could be taking place at Ford. But the details are not yet clear.

"I'm not at liberty at the moment to announce specifically what sort of changes are being made, but over the next several months you'll be hearing quite a bit more specific actions that we'll be taking with our dealer body," says Moore. "There's been a substantial amount of work being done over the past year or so to get at specific actions to address that concern."

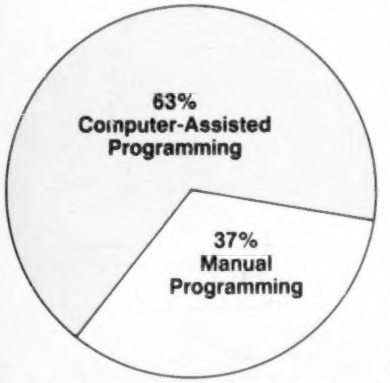
Moore hints that Ford will bring its Dr. Deming program to the dealer level and teach them statistical problem solving techniques. ■

Single copies of this article are free. Circle 502 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

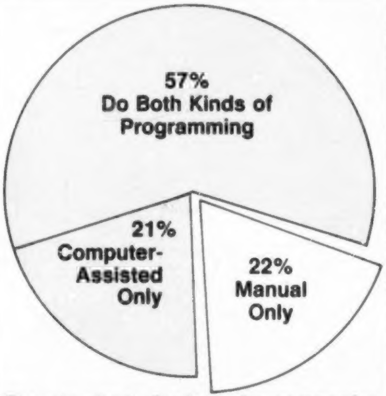
NMTBA

REPORTS TRENDS

The results are in from a National Machine Tool Builders' Assoc. survey of its membership concerning numerical control (NC) part programming. The report, developed by the association's NC Software Committee, indicates the growing importance of computer assistance in NC part programming.

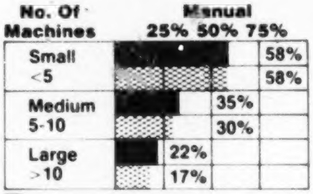


Computer assistance has taken nearly a 2 to 1 edge over manual programming techniques in NC part programming, according to the survey. John B. Deam, technical director of NMTBA, claims it's a trend which should increase in the future.

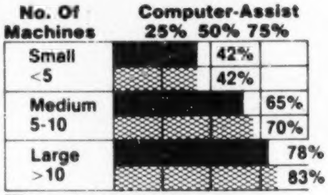


The pie chart displays the companies which use manual programming only, computer assisted only, or a combination of the two. One out of every five installations use manual programming only. According to NMTBA's Deam, the manual-only portion of the pie will gradually shrink during this decade.

Manual Programming Done More By Small Users Of NC Machines.



Computer-Assist Programming Tends To Increase As More NC Equipment Is Used.



■ By Size Of Installation ▨ Machine Weighted

The Machine Weighted Factor Follows The Same Trend In Both Charts.

These charts show the amount of computer assistance by size of installation. It also displays the share of programming when calculated on a machine weighted basis. For example, an installation which has twice as many NC machines would be weighted twice as heavily in calculating the average. The survey also indicates that the larger the size of the installation, the more likely it is that at least some computer assistance will be used.

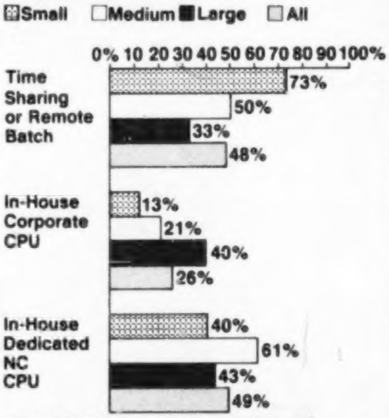
Note: According to the report, a small installation has fewer than five NC machine tools; a medium sized installation has between five to ten machine tools; and a large installation has more than ten machine tools installed.

The survey was directed to NMTBA's approximately 400 member companies. The committee received 95 usable responses. And while the automakers weren't surveyed, NMTBA suggests the data is sufficiently representative of all classes of users that the results will be found to be informative, as well as useful to all. ■

Single copies of this article are free. Circle 508 on the Information Card.

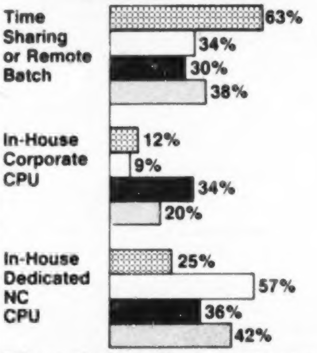
COMPUTER-ASSISTED PROGRAMMING MEANS

USAGE BY INSTALLATION



This graph shows the percentage of installations that use at least 5% of a given technique. (Note that many installations use more than one technique.)

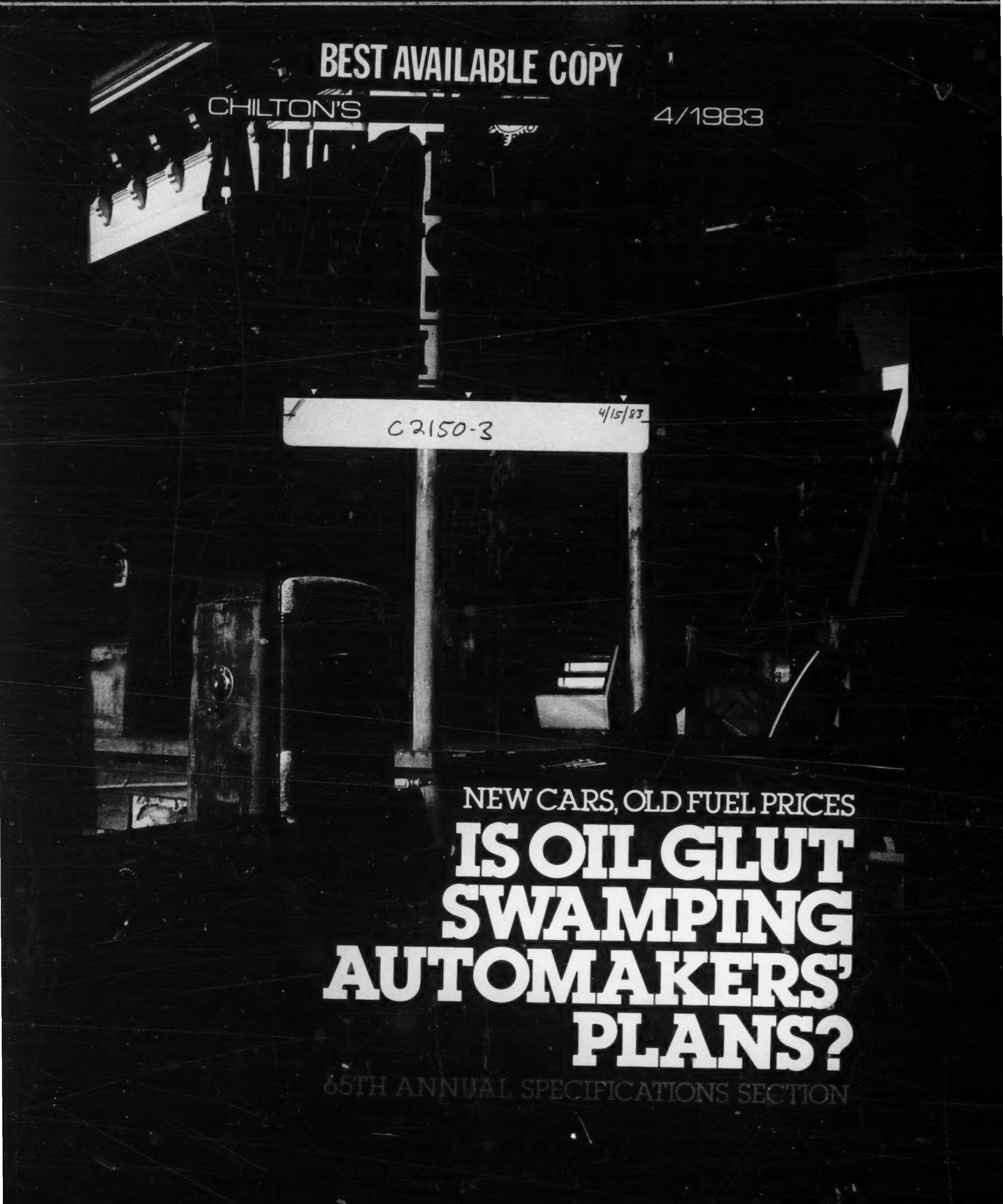
DISTRIBUTION OF TOTAL USAGE



This graph shows the average usage of each technique on a percentage basis.

The survey quotes half of all respondents use time sharing or remote batch computer assistance techniques. The study also reveals that there's a definite trend towards the use of in-house computers—some companies will use inhouse dedicated computers while a smaller percentage will use in-house corporate computers.

CHILTON'S
4/1983



C2150-3
4/15/83

NEW CARS, OLD FUEL PRICES

IS OIL GLUT SWAMPING AUTOMAKERS' PLANS?

65TH ANNUAL SPECIFICATIONS SECTION

AUTOMOTIVE INDUSTRIES

April, 1983/Volume 163, Number 4

FEATURES

6 Oil Glut Swamps Automakers' Plans
Cheaper and cheaper gasoline in the US is raising havoc with all the downsized, fuel efficient plans from Detroit and the imports.

12 Mini Diesel Bows In Japan
Daihatsu's re-done Charade offers a 1.0-L three-cylinder diesel and a claim of 87 mpg.

23 Computers Key To Future Engines
The on-board computer, heralded as a thing of the future, is ready to take on Europe.

24B *AI's* Total Car Coefficient Sums It Up
AI computes the attributes of an ideal car, and tells you which models come closest to this lofty goal.

25 Squeeze Forming Combines Casting With Forging
A new hybrid technique, developed in Britain, enables automakers to consider aluminum alloys for large structural parts.

Specifications

13 US Standard Engines
14 World Commercial Vehicles Production
14C US Optional Engines
14F US Selected Body Dimensions
14M US Automatic Transmission
14Q US Manual Transmission
15 European Market Share
16 International Passenger Car Production
18 Imported Passenger Cars

NEWS & DEPARTMENTS

3 Editorial: Get Government Out Of CAFE
3 Editorial & Business Staffs
4 Newsline
5 Marketdata
26 New Product Showcase
26D Technical Literature
26E Business Managers
26F Advertisers' Index
27 Reader Information Cards

** Certain editorial items appear only in the North American edition, or in the International edition.*

COVER

Contrasting the old and the new are Birchrunville's (PA) 1898 store and Cadillac's 1983 Sedan deVille.

NEXT MONTH

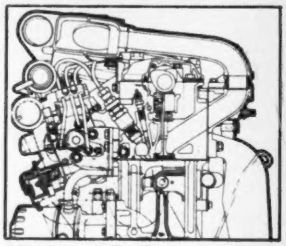
A hard look at sourcing in America plus an interview with Chrysler's top stylist in May.

QUOTABLE

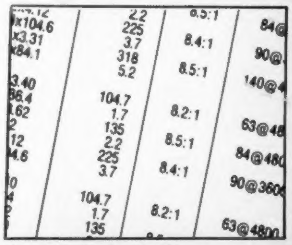
Carroll Shelby, on lead times—"If someone comes up with an idea in Detroit, it usually takes months of committee meetings before something's decided. GM takes about 20 meetings for an order to be executed and Ford takes 17. Chrysler takes about 9 or 10 because of all the people they had to let go. The Japanese take 6, the Germans somewhere around the Americans, and I don't think the English have meetings—it just happens or it doesn't."

UNLEADED
.99⁹
LITER PRICE

Oil Glut—P. 6



Mini Diesel—P. 12



Specifications—P. 13

Jeanneau Motorcar—P. 4

New Products—P. 26

AUTOMOTIVE INDUSTRIES (ISSN 0273-656x) magazine is published monthly by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: United States and US Possessions—$30.00 per year, $55.00 for 2 years; Canada and Foreign—$75.00 per year. Air rates on request. Single copies and back issues on request. All subscription orders must be accompanied by cash or check, along with complete information for classification, including the title of the individual and the product the company manufactures. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. POSTMASTER: Send address changes to AUTOMOTIVE INDUSTRIES, P.O. Box 2055, Radnor, PA 19089. ©Chilton Company, 1983. Permission to photocopy for internal use or the internal use of specific clients is granted by Chilton Company for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $1.00 per copy of the article, plus 25¢ per page is paid directly to the CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to The Editor. (0273-656x/83 $1.00 + 25¢)

1983 US PASSENGER CARS
STANDARD ENGINES—49 STATES & HIGH ALTITUDE

PASSENGER CARS MAKE AND MODEL		No. of Cylinders	Type of Cylinder	Valve Arrangement	Bore and Stroke in./mm	Displacement cu in./L	Compression Ratio	Net Brake hp @ rpm	Net Torque @rpm	Net hp/Cubic Displacement bhp/cu in. hp/L	Fuel Delivery; Carburetor Barrels/ Fuel Injection System
GENERAL MOTORS CORP. (Continued)											
Regal Sport Coupe	USA	6	90°V	OHV	3.80x3.40	231	8.0:1	180@4000	290@2400	.779	4[2]
	Metric				96.5x86.4	3.8				47.4	
Riviera, Electra	USA	6	90°V	OHV	3.97x3.40	252	8.0:1	125@4000	205@2000	.496	4
	Metric				100.8x86.4	4.1				30.5	
Cadillac Cimarron	USA	4	IL	OHV	3.50x3.15	121	9.3:1	88@4900	100@3000	.711	TBI
	Metric				88.9x80.0	2.0				43.0	
Seville, Eldorado,	USA	8	90°V	OHV	3.47x3.31	250	8.5:1	135@4400	200@2200	.540	TBI
DeVille, Brougham	Metric				88.1x84.1	4.1				32.9	
Chevrolet Chevette	USA	4	IL	OHC	3.23x2.98	98	9.0:1	65@5200	80@3200	.663	2
	Metric				82.0x75.7	1.6				40.6	
Cavalier	USA	4	IL	OHV	3.50x3.15	121	9.3:1	88@4800	110@2400	.727	TBI
	Metric				88.9x80.0	2.0				44.0	
Citation, Celebrity, Camaro	USA	4	IL	OHV	4.00x3.00	151	8.2:1	92@4000	134@2800	.609	TBI
	Metric				101.6x76.2	2.5				36.8	
Camaro Berlinetta	USA	6	60°V	OHV	3.50x2.99	173	8.5:1	107@4800	145@2100	.618	2
	Metric				89.0x76.0	2.8				38.2	
Camaro Z28	USA	8	90°V	OHV	3.74x3.48	305	8.6:1	150@4000	240@2400	.492	4
	Metric				94.9x88.4	5.0				30.0	
Citation X11	USA	6	60°V	OHV	3.50x2.99	173	8.9:1	135@5400	145@2400	.780	2
	Metric				89.0x76.0	2.8				40.2	
Monte Carlo, Malibu, Impala, Caprice	USA	6	90°V	OHV	3.74x3.48	229	8.6:1	110@4000	190@1600	.480	2
	Metric				94.9x88.4	3.8				28.9	
Monte Carlo, SS	USA	8	90°V	OHV	3.74x3.48	305	8.6:1	175@4800	235@3200	.492	4
	Metric				94.9x88.4	5.0				30.0	
Corvette	USA	8	90°V	OHV	4.00x3.48	350	9.0:1	205@4300	290@2800	.586	DTBI
	Metric				101.6x88.4	5.7				36.0	
Oldsmobile Firenza	USA	4	IL	OHC	3.34x3.11	110	9.0:1	84@5200	102@2800	.764	TBI
	Metric				84.8x79.0	1.8				46.7	
Ciera, Omega	USA	4	IL	OHV	4.00x3.00	151	8.2:1	90@4000	134@2400	.596	TBI
	Metric				101.6x76.2	2.5				36.0	
Cutlass, 88	USA	6	90°V	OHV	3.80x3.40	231	8.0:1	110@3800	190@1600	.476	2
	Metric				96.5x86.4	3.8				28.9	
Hurst/Olds	USA	8	90°V	OHV	3.80x3.39	307	8.0:1	180@4000	245@3200	.586	2
	Metric				96.5x86.0	5.0				36.0	
98, Toronado	USA	6	90°V	OHV	3.97x3.40	252	8.0:1	125@4000	205@2000	.496	4
	Metric				100.7x86.4	4.1				30.5	
Pontiac 1000	USA	4	IL	OHC	3.23x2.98	98	9.0:1	65@5200	80@3200	.663	2
	Metric				82.0x75.7	1.6				40.6	
2000	USA	4	IL	OHC	3.34x3.11	110	9.0:1	84@5200	102@2800	.764	TBI
	Metric				84.8x79.0	1.8				46.7	
6000, Phoenix, Firebird	USA	4	IL	OHV	4.00x3.00	151	8.2:1	94@4000	135@2800	.623	TBI
	Metric				101.6x76.2	2.5				37.6	
6000STE, Phoenix SJ, Firebird S/E	USA	6	60°V	OHV	3.50x2.99	173	8.9:1	130@5400[3]	145@2400	.751	2
	Metric				88.9x75.9	2.8				46.4	
Firebird Trans Am	USA	8	90°V	OHV	3.74x3.48	305	8.6:1	145@4000	240@2000	.475	4
	Metric				94.9x88.4	5.0				29.0	
Grand Prix, Bonneville, Parisienne	USA	6	90°V	OHV	3.80x3.40	231	8.0:1	110@3800	190@1600	.475	2
	Metric				96.5x86.4	3.8				28.9	
VOLKSWAGEN OF AMERICA											
Rabbit L	USA	4	IL	OHC	3.13x3.40	105	8.0:1	65@5000	88@2800	.619	2
	Metric				79.5x86.4	1.7				38.2	
Rabbit LS & GL	USA	4	IL	OHC	3.13x3.40	105	8.2:1	74@5000	90@3000	.705	CIS
	Metric				79.5x86.4	1.7				43.5	
Rabbit GTI	USA	4	IL	OHC	3.19x3.40	109	8.5:1	90@5500	100@3000	.826	CIS
	Metric				81.0x86.4	1.8				50.0	

FOOTNOTES:
[1]—estimate
[2]—turbocharged
[3]—Firebird S/E rated at 125 hp, Phoenix SJ rated at 135 hp

ABBREVIATIONS:
CIS—Continuous Injection System
DFI—Digital Fuel Injection
DTBI—Dual Throttle Body Icjection
EFI—Electronic Fuel Injection
IL—In-Line
OHC—Overhead Camshaft
OHV—Overhead Valve
TBI—Throttle Body Injection
VV—Variable Venturi Carburetor

WORLD COMMERCIAL VEHICLES PRODUCTION FORECAST
Includes heavy & light trucks, buses, road tractors and specialty vehicles

	1980	1995
World Population (mil)	4396.4	5711.2
Vehicles in use/000 capita	20.0	25.1
WORLD PRODUCTION (000)	10636.5	16760
United States	1633.5	4050
Other North American	527.5	600
European Community	1416.9	1615
Other Western Europe	209.9	365
Japan	4004.8	4500
Other Asia-Oceania	603.5	1530
Latin America	877.9	1680
Eastern Europe	1123.5	1825
Africa-Mideast	239.0	595

Source: Predicasts, Inc.

INTERNATIONAL STATISTICS

European Market Share — Group A

Western Europe: market shar analysis by country and manufacturer, passenger cars, 1981 and 1982, percentages

	France		F.R. Germany		Italy		United Kingdom	
	1981	1982	1981	1982	1981	1982	1981	1982
European Producers								
Alfa Romeo	1.4	1.5	0.6	0.5	6.4	6.4	—	—
BL	1.1	1.6	—	—	1.4	1.7	19.2	17.9
BMW	1.3	1.6	5.9	6.1	2.0	1.8	1.2	1.5
Fiat	4.5	4.9	4.1	4.4	50.9	51.7	4.2	3.1
Ford	5.5	6.5	11.6	11.3	5.4	5.1	30.9	30.5
General Motors	1.9	2.5	16.8	18.8	3.5	3.7	8.6	11.7
Lada	1.0	1.0	—	—	—	—	1.0	1.1
Mercedes-Benz	—	—	10.5	10.8	—	—	—	—
Moto Koz	—	—	—	—	—	—	—	—
PSA	32.9	30.2	4.3	4.0	9.6	8.4	7.6	6.4
Renault	38.9	39.2	4.4	4.0	10.2	11.1	4.9	4.1
Saab	—	—	—	—	—	—	—	—
Seat	—	—	—	—	—	—	—	—
VAG	6.7	6.1	30.0	29.1	6.5	6.8	5.4	6.0
Volvo	—	—	0.6	0.6	0.9	0.9	3.0	3.3
*Japanese producers–total	2.6	2.9	9.7	9.0	—	—	11.0	10.9

— Less than minimum market share shown in this column

* This figure represents total of all Japanese companies

Source: Auto Trend

European Market Share — Group B

Western Europe: market share analysis by country and manufacturer, passenger cars, 1981 and 1982, percentages

	Belgium		Netherlands		Spain	
	1981	1982	1981	1982	1981	1982
European Producers						
Alfa Romeo	—	—	—	—	0.3	0.2
BL	—	—	—	—	—	—
BMW	3.0	3.3	3.0	3.6	0.6	0.8
Fiat	6.2	6.0	4.2	5.5	0.2	0.3
Ford	9.0	9.2	10.3	10.5	14.4	16.1
General Motors	8.6	10.3	14.3	16.3	0.7	3.2
Lada	3.5	4.5	1.7	2.3	—	—
Mercedes-Benz	2.5	2.4	2.0	1.9	0.8	0.7
Moto Koz	—	—	—	—	—	—
PSA	14.3	13.6	13.4	12.0	20.9	17.9
Renault	9.2	9.7	8.2	8.0	33.6[1]	33.5[1]
Saab	—	—	—	—	—	—
Seat	—	—	—	—	26.5	25.5
VAG	12.8	13.2	9.7	8.9	0.6	0.5
Volvo	2.2	2.0	4.1	4.2	0.3	0.3
*Japanese producers–total	24.5	20.9	24.5	22.2	—	—

[1] Including Renault-Fasa

— Less than minimum market share shown in this column

* This figure represents total of all Japanese companies

Source: Auto Trend

European Market Share — Group C

Western Europe: market share analysis by country and manufacturer, passenger cars, 1981 and 1982, percentages

	Austria		Denmark		Finland		Ireland		Norway		Portugal		Sweden		Switzerland	
	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982
European Producers																
Alfa Romeo	1.1	1.3	—	—	—	—	0.5	0.5	—	—	0.7	0.9	—	—	3.0	3.0
BL	—	—	—	—	—	—	4.3	4.0	—	—	5.1	5.7	—	—	—	—
BMW	3.6	3.6	1.6	2.1	—	—	0.7	0.9	1.4	2.2	1.2	1.6	1.6	1.7	4.1	4.6
Fiat	6.3	6.1	3.6	4.8	6.1	5.6	9.7	9.2	1.6	1.6	13.7	13.3	1.8	1.9	9.1	8.9
Ford	9.2	8.6	15.4	16.1	9.9	9.7	21.6	22.8	15.6	15.2	6.3	7.2	11.2	10.2	8.4	8.2
General Motors	12.1	14.2	12.5	14.4	6.3	8.6	10.9	11.1	13.1	13.4	7.3	7.4	8.7	10.3	12.1	13.7
Lada	—	—	6.1	6.0	9.0	8.7	—	—	3.5	3.4	—	—	1.5	1.3	—	—
Mercedes-Benz	2.8	2.5	—	—	2.3	2.4	0.6	0.7	1.3	1.3	0.9	1.0	3.0	2.9	1.8	2.3
Moto Koz	—	—	6.1	8.9	2.8	2.9	—	—	—	—	—	—	—	—	—	—
PSA	8.6	7.2	7.7	7.4	7.7	7.5	5.0	4.0	5.9	5.4	18.7	18.9	3.3	2.5	8.7	8.2
Renault	5.1	6.1	—	—	—	—	8.7	10.4	—	—	29.0	31.1	—	—	6.9	7.1
Saab	—	—	2.5	2.2	5.7	5.3	—	—	2.1	2.0	—	—	14.3	14.1	—	—
Seat	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
VAG	21.8	20.8	6.9	5.4	5.3	4.9	6.6	6.7	10.8	10.8	2.7	2.2	12.5	11.6	13.9	14.1
Volvo	1.8	1.6	5.2	3.5	5.8	4.6	1.5	1.4	6.8	6.3	1.3	1.4	26.6	26.5	2.0	2.1
*Japanese producers–total	24.8	25.8	24.3	25.4	32.2	34.8	29.6	27.6	34.4	36.6	12.5	8.4	13.8	15.3	26.3	25.2

— Less than minimum market share shown in this column

* This figure represents total of all Japanese companies

Source: Auto Trend

European Passenger Car Production

Western Europe: production of passenger cars by country, 1975-82, units

	1975	1976	1977	1978	1979	1980	1981	1982
EEC								
Belgium	196,776	299,263	302,869	282,391	263,072	191,016	216,068	246,221
France	2,546,154	2,979,559	3,092,439	3,111,380	3,220,394	2,938,581	2,611,884	2,777,112
F.R. Germany	2,907,819	3,546,900	3,790,544	3,890,176	3,932,556	3,520,934	3,577,807	3,761,436
Italy	1,348,544	1,471,308	1,440,470	1,508,597	1,480,904	1,445,221	1,257,340	1,297,351(P)
Netherlands	80,528	74,223	53,368	64,881	90,204	80,779	77,922	48,779(1)
United Kingdom	1,267,695	1,333,449	1,327,820	1,222,949	1,070,452	923,744	954,650	887,679
Total	8,327,518	9,704,702	10,007,510	10,080,374	10,077,582	9,100,275	8,695,651	—
EFTA								
Austria	284	1	—	—	2,781	7,528	7,073	5,870(2)
Finland	25,042	27,332	23,000	23,000	28,000	21,500	22,828	25,000(E)
Sweden	316,386	317,380	235,383	254,256	296,540	235,320	258,261	294,792(P)
Switzerland	—	—	—	—	—	—	—	—
Total	341,786	344,713	258,383	277,256	327,321	264,348	288,162	—
Other								
Spain	696,124	753,125	988,964	986,116	965,809	1,028,813	855,325	852,060(3)
Total	9,365,406	10,802,540	11,254,857	11,343,746	11,370,712	10,393,436	9,839,138	—

(E) - Estimate (P) - Provisional (1) - Cumulative for 7 month period (2) - Cumulative for 9 month period (3) - Cumulative for 11 month period

Source: National Sources

French Passenger Car Production

France: production of passenger cars by manufacturer, 1978-82, units

	1978	1979	1980	1981	1982
Citroen	678,949	679,327	536,366	533,922	522,317
Peugeot	742,303	754,446	607,033	569,287	536,500
Talbot[1]	447,971	381,289	302,843	212,942	226,455
Renault[2]	1,242,157	1,405,330	1,492,339	1,295,713	1,491,840
Total	3,111,380	3,220,394	2,938,581	2,611,884	2,777,112

[1] Including Matra Simca

[2] Including Alpine

Source: CSCA

UK Passenger Car Production

United Kingdom: production of passenger cars by manufacturer, 1978-82, units

	1978	1979	1980	1981	1982
Ford	324,407	398,694	342,767	342,171	306,635
GM	84,041	58,765	55,002	69,932	112,669
Total U.S. owned	408,448	457,459	397,769	412,103	419,304
BL	611,625	503,767	395,820	413,440	405,116
Talbot	196,481	102,977	125,314	117,439	56,235
Others	6,395	6,249	4,841	11,668	7,024
Total	1,222,949	1,070,452	923,744	954,650	887,679

Source: SMMT

Spanish Passenger Car Production

Spain: production of passenger cars by manufacturer, 1978-82, units

	1978	1979	1980	1981	1982 1st 11 mos.
Ford	260,939	227,493	260,005	248,045	207,721
GM	—	—	—	—	13,546
Total U.S. owned	260,939	227,493	260,005	248,045	221,267
Citroen	106,434	109,130	84,836	74,495	84,705
Fasa-Renault	235,329	261,430	324,680	269,029	273,207
Seat	284,480	294,865	293,536	204,847	224,200
Talbot	98,934	72,891	65,758	58,909	48,681
Total	986,116	965,809	1,028,813	855,325	852,060

Source: ANFAC

German Passenger Car Production

F.R. Germany: production of passenger cars by manufacturer, 1978-82, units

	1978	1979	1980	1981	1982
Ford	544,160	546,957	419,517	486,917	518,440
GM	952,656	960,243	786,663	810,158	951,456
Total US owned	1,496,816	1,507,200	1,206,180	1,297,075	1,469,896
Audi-NSU Auto Union	295,000	323,395	285,052	311,671	305,024
BMW	311,793	328,281	330,087	337,757	362,607
Daimler-Benz	403,707	433,203	438,829	449,010	465,503
Porsche	36,879	36,011	28,622	31,734	36,329
Volkswagenwerk	1,345,981	1,304,466	1,232,164	1,150,560	1,122,077
Total	3,890,176	3,932,556	3,520,934	3,577,807	3,761,436

Source: VDA

Italian Passenger Car Production

Italy: production of passenger cars by manufacturer, 1978-82, units

	1978	1979	1980	1981	1982 11 mos.
Alfa Romeo	219,499	207,514	219,571	197,287	178,069
Ferrari[1]	1,939	2,306	2,381	2,586	2,080
Fiat	1,104,026	1,061,386	995,455	878,365	858,835
Autobianchi[1]	89,436	88,734	76,585	76,987	73,149
Innocenti[1]	40,719	39,991	39,770	23,187	20,548
Lamborghini	68	55	64	89	100
Lancia[1]	52,462	80,459	110,756	78,257	61,328
Maseratl	339	371	555	528	1,785
De Tomaso	109	86	84	74	79
Bertoné	—	—	—	—	7,199
Pininfarina	—	—	—	—	3,453
Total	1,508,597	1,480,904	1,445,221	1,257,340	1,206,625

[1] Fiat Auto

Source: ANFIA

AUTOTREND comprises data banks and automobile demand forecasting models for the United States and major European markets.
AUTOTREND is a trademark of James McArdle & Associates
James McArdle & Associates • 48 Grafton Way • London W1P 5LB • England • telephone: (0)1-388-4932 • Telex: 297320

Single copies of this article are free. Circle 505 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

ALL NEW!!

AI'S TOTAL CAR

TCC	Below $8000
.37	**Toyota Tercel Deluxe, 5-spd man.**
.37	**Dodge Omni 2.2-L, 5-spd man.**
.35	Mazda GLC Sport, 5-spd man.
.33	Honda Civic 1500S, 5-spd man.
.32	Plymouth Turismo 2.2-L, 5-spd man.
.31	Nissan Stanza XE 5-spd man.[1]
.29	VW Rabbit L diesel 4-spd man.
.29	Ford Escort GT, 5-spd man.
.29	Nissan Pulsar NX, 5-spd man.
.29	Renault Alliance Limited, 5-spd man.
.28	Ford Tempo, 4-spd man.
.27	Chevrolet Citation X-11 2.8-L, 4-spd man.
.27	Mazda 626 5-spd man.
.26	Pontiac 2000 1.8-L, 5 spd man.
.26	VW Rabbit GTI
.23	Isuzu I-Mark LS, gas, 5-spd man.
.23	Chevrolet Cavalier CL 2.0-L, 5-spd man.
.22	Chevrolet Chevette diesel, 5-spd man.
.22	Buick Skyhawk T-Type 1.8-L, 5-spd man.
.20	**Isuzu I-Mark LS diesel, 5-spd man.**
.20	**Oldsmobile Firenza GT 2.0-L, 4-spd man.**
.28	**Group Average**

[1]—California spec.

TCC	$8000 to $12,000
.23	**Honda Accord LX, 5-spd man.[1]**
.23	**Mercury Capri RS 5.0-L, 4-spd man.**
.22	Renault 18i, 5-spd man.
.21	Mitsubishi Tredia LS 4x2-spd man.
.21	Dodge 600 ES 2.2-L, 5-spd man.
.20	Audi 4000 gas, 5-spd man.
.20	Mercury Marquis Brougham 3.8-L, 4-spd A/T
.19	Oldsmobile Ciera LS diesel, 3-spd A/T
.19	Mitsubishi Cordia LS, 4x2-spd man.[1]
.18	VW Scirocco, 5-spd man.
.18	Ford Thunderbird Turbo Coupe, 5-spd man.
.18	Chrysler E-Class 2.6-L, 3-spd A/T
.17	Toyota Celica GT-S, 5-spd man.
.16	Oldsmobile Hurst Cutlass 5.0-L, 4-spd A/T
.16	Chevrolet Caprice Classic 5.0-L, 4-spd A/T
.13	Pontiac Firebird Trans Am 5.0-L, 3-spd A/T
.12	**Pontiac Grand Prix 5.7-L diesel, 3-spd A/T**
.19	**Group Average**

TCC	$12,000 to $16,000
.19	**VW Quantum GL Turbodiesel, 5-spd man.**
.16	Toyota Cressida 5-spd man.
.15	Audi Coupe, 5-spd man.
.14	Pontiac 6000 STE 2.8-L, 3-spd A/T
.14	BMW 320i, 5-spd man.
.14	Mitsubishi Starion LS, 5-spd man.
.13	Cadillac Cimarron, 5-spd man.
.12	**Chrysler New Yorker 5th Ave. 5.2-L, 3-spd A/T**
.15	**Group Average**

Who makes an 'ideal' car? Rather than rely on some subjective popularity poll or the prejudices of our staff, *AI* gives you the answer using purely objective attributes.

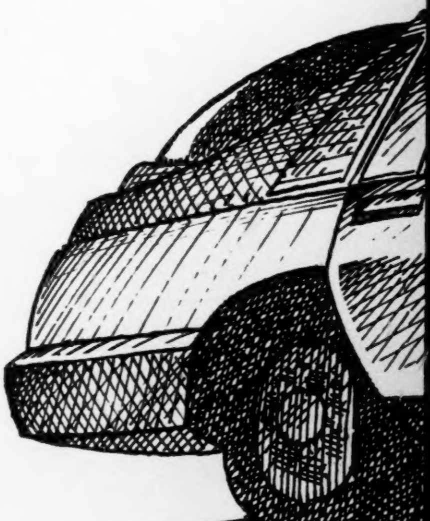
by Lance A. Ealey

What attributes should an ideal car possess? If you trim off the "fringe" consumers—the lead foot basher and the ultra-high mpg Scrooge—most people would agree that the ideal car should be roomy inside, get good mileage, be reasonably quick in acceleration and relatively inexpensive.

AI has devised a formula, using objective measurements, to produce one meaningful value from all four of the above attributes. The equation is:

$$\frac{\text{interior volume x mpg}}{\text{0-60 mph time x price}} \text{ x } 10 = \text{TCC}$$

The EPA provides interior volumes (cu ft) and city mpg while various enthusiast magazines supply the 0-60 times and the *Kelly Blue Book* provides the retail prices. The only options figured into the base re-



COEFFICIENT SUMS IT UP

tail price were those that effected performance—transmission, engine, sport suspension, etc.

Interior volume and mpg are divided by 0-60 times and retail price because the latter two are essentially inverse factors—the lower the better. The result is multiplied by ten and rounded off purely for ease of reading.

While the ideal car is, unfortunately, unattainable, an ideal "composite" among those tested here would have the interior volume of a Chevy Caprice (110 cu ft), the city fuel efficiency of a Rabbit diesel (48 mpg), the 0 to 60 time of a Capri RS 5.0-L V8 (6.3 seconds) and the price of a Toyota Tercel ($5898). The "ideal" car's Total Car Coefficient (TCC) would be 1.42.

Conversely, the worst faring car among those tested would have the interior volume of a Porsche 944 (63 cu ft), the fuel efficiency of a Jaguar XJ-S (14 mpg), the 0 to 60 time of a Chevette diesel (23 seconds) and the price tag of a Mercedes-Benz 380 SEC ($53,570). It's TCC would be .01.

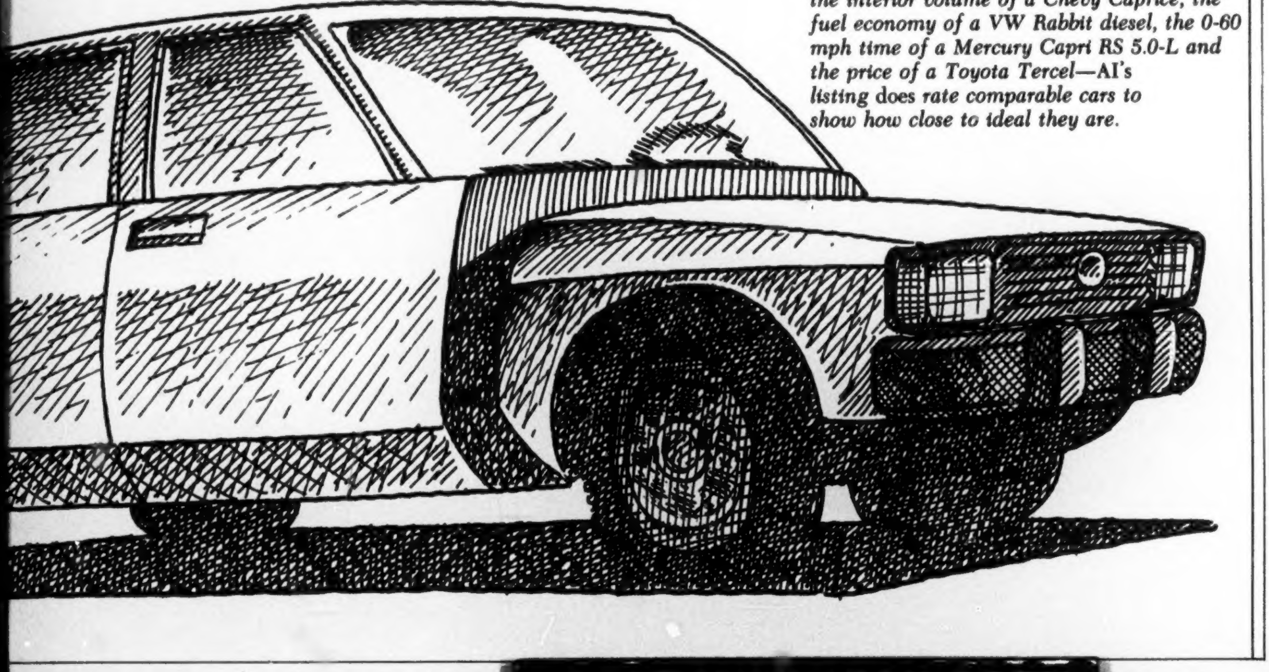
The case can be made for keying such items as drag coefficient, lateral g-force, durability record and resale value into the equation. However, the first is already expressed to an extent in the mpg figure, cornering g-force is not a major consideration for most drivers under "normal" driving conditions, and durability and resale values for just-marketed cars are unknowns.

To make things as fair as possible, we've divided the cars into price classes. The overall best and worst? Toyota's Tercel and Dodge's Omni 2.2 tied for top honors with a TCC of .37. At the other end of the scale, Mercedes' ultra coupe 380 SEC got a TCC of .03. ■

Single copies of this article are free. Circle 504 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

TCC	$16,000 to $20,000
.12	**Saab APC Turbo, 5-spd man.**
.11	Audi 5000 Turbodiesel, 5-spd man.
.11	Volvo 760 GLE Turbodiesel, 4-spd + OD man.
.10	Porsche 944, 5-spd man.
.09	**Audi 5000 Turbo**
.11	**Group Average**

TCC	$20,000 and Above
.08	**BMW 528e, 5-spd man.**
.06	BMW 733i, 5-spd man.
.05	Audi Quattro
.04	Buick Riviera Convertible 4.1-L
.04	Porsche 928S, 5-spd man.
.04	Jaguar XJ-S
.03	**Mercedes-Benz 380 SEC**
.05	**Group Average**



While the ideal car does not exist—one with the interior volume of a Chevy Caprice, the fuel economy of a VW Rabbit diesel, the 0-60 mph time of a Mercury Capri RS 5.0-L and the price of a Toyota Tercel—AI's listing does rate comparable cars to show how close to ideal they are.

CHILTON'S 5/1983

AUTOMOTIV INDUSTRIES

NORTH AMERICAN

Fremont: What Toyota Will Teach GM

Inside Pontiac's Mid-Engine Fiero

CR150-30

Chrysler's De La Rossa

Worldwide Sourcing: Survival Through Joint Ventures

Dawn Of The Mini Van

AUTOMOTIVE
INDUSTRIES
NORTH AMERICAN

May, 1983/Volume 163, Number 5

FEATURES

7 Styling, Aerodynamics & The MiniVan
With the long-overlooked field of car design again receiving major attention, Donald DeLaRossa offers *AI* insights into Chrysler's role.

10D ECV-3: The Image In BL's Crystal Ball
BL Technology's latest energy conservation vehicle, the ECV-3, is a test bed of ideas for the future.

11 European Statistics
A closer look at the latest production/marketing data from Europe.

12 Inside Pontiac's Mid-Engine Fiero
Detailed analysis of just how Job One Pontiac P-cars will measure up.

14D Audi 5000's Aero Blitz/VW Vanagon's Wasserboxer
Both the reskinned Audi 5000 and VW's Vanagon with its new water-cooled engine have been refined for their American debuts.

15 What Toyota Will Teach GM
When Toyota gets through reorganizing GM's Fremont, CA plant, it will be the most efficient assembly operation in America.

17 Survival Through Joint Ventures
In Europe, joint ventures among vehicle makers, suppliers and between the two industries are more and more common as companies seek greater economies of scale and higher quality.

NEWS & DEPARTMENTS

3 Editorial: We Need A US Inc.
4 Letters: Flak-Catching Fuel Saver
5 Marketdata
6 Newsline
18C New Products
18D Business Managers
18D Advertisers' Index
19 Reader Information Cards

** Certain editorial items appear only in the North American edition, or in the International edition.*

COVER

Chrysler VP Don DeLaRossa explains his company's direction in styling and development of the minivan.

NEXT MONTH

The 1983 Suppliers' Issue brings you an updated Source Guide plus a close look at "buying American."

QUOTABLE

Steve Fitzpatrick, auto analyst for PA International Management Consultants Inc., on Japanese suppliers—"A Japanese company will probably tell you it takes two years to train the suppliers to match the vehicle manufacturer's needs. They've got to have very well trained suppliers—people who send a truck filled with car seats which are arranged inside the truck in the order they are going to be used in production!"

Styling—P. 7

Fiero—P. 12

Toyota/GM—P. 15

Joint Ventures—P. 17

Newsline—P. 6

AUTOMOTIVE INDUSTRIES (ISSN 0273-656x) magazine is published monthly by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: United States and US Possessions—$30.00 per year, $55.00 for 2 years; Canada and Foreign—$75.00 per year. Air rates on request. Single copies and back issues on request. All subscription orders must be accompanied by cash or check, along with complete information for classification, including the title of the individual and the product the company manufactures. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. POSTMASTER: Send address changes to AUTOMOTIVE INDUSTRIES, P.O. Box 2055, Radnor, PA 19089. ©Chilton Company, 1983. Permission to photocopy for internal use or the internal use of specific clients is granted by Chilton Company for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $1.00 per copy of the article, plus 25¢ per page is paid directly to the CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to The Editor. (0273-656x/83 $1.00 + 25¢)

AI MARKETDATA

'84 Corvette: $21,800

Lookit, if you want the stripper, OK, but if I was you I'd get those adjustable sport bucket seats and all that *hi-per* stuff—the low axle ratio, the oil cooler, the H-D radiator. Understand? What about this defogger for yer back glass and rearviews? An' look—power door locks and yer very own Z51 Performance Handling Package! Underline that, and get the Delco-GM/Bose Music System. Get the transparent lift-off roof panel, the six-way power seat, the electronic speed control. Let 'em know you're loaded! Get the custom two-tone paint. All for just a tad over $26,300. 'Swhat I'd do if I was you.

Data Base Car Selling

A consumer data base company has come up with an innovative new way to provide car makers with millions of potential buyers up to six months before the actual purchase. JFY, of Melville, NY audits over 2 million unduplicated households every three months, and the company recently began auditing new car buying plans. Chevrolet, Pontiac and Lincoln-Mercury have all apparently shown interest in the system, according to JFY. Harry Dale, president of JFY, says that initial test audits verified by R.L. Polk indicated an adjusted 38% of the people who said they were potential new car buyers actually did buy a new car within six months, and that of those, up to 80% who expressed a preference for domestic or imported cars actually bought their preference.

Citibank's Oracle

Auto sales will total 9.1 million units this year, up from 8.0 million in 1982, says Citibank Economic Forecast Service. Domestic producers will gain 75% of the market, up from 72% last year. This breaks out to 6.8 million domestic cars and 2.3 million imports. Citibank sees 10.5 and 10.9 million units sold respectively in 1984 and 1985, and says unit sales could level off to 10.5-11.0 million units annually in the second half of the decade.

New Car Sales (millions of units)

	'83	'84	'85	'86	'87	'88
Total Sales	9.1	10.5	10.9	10.9	10.8	10.6
Domestic	6.8	8.0	8.3	8.5	8.4	8.3
Imported	2.3	2.5	2.6	2.5	2.4	2.3
Import share	25.3%	23.4%	23.9%	22.7%	22.2%	21.7%

Source: Citibank Economics Dept.

Mini-Van Dike To Break

According to a forecast model developed by Chase Econometrics, the base case 1986 outlook for the mini-van market is 300,000 units, representing 9% of the US light truck industry. Chase says the mini-van will take significant bites out of the full-size van and station wagon segments. The optimistic outlook is for almost 500,000 units in '86—a 15% share of the US light truck industry.

Dieselectronic

Stanadyne Diesel Systems has developed two electronic injection systems for use in diesel cars and light trucks. Both are available for immediate application. Designated the PCF and PCL systems (the former indicates "full" and the latter "limited" electronic authority), both increase fuel metering and injection timing accuracy. The PCF pump also replaces the mechanical governor with its microprocessor.

News In Brief

United Technologies Automotive Group is **dropping its American Bosch trademark** and will begin selling its diesel fuel injection equipment under the name United Technologies Diesel Systems. German supplier Robert Bosch crows a little and says that for the first time in nearly 40 years the company will be able to use the name Bosch, without additional reference, on its products in the US. ■ **Allstate has dropped** the '83 Honda Accord from its favorable rating list because the new car's bumpers aren't as strong as those on prior year models. ■ **Luigi Zucchet has resigned** as president and CEO of Alfa Romeo Inc., Alfa's US subsidiary, and will be replaced by Ernesto Vettore, who is currently a corporate director for Alfa in Italy. ■ **March sales for Jaguar** in the US were up 100% over a year ago, or 1441 cars. First quarter sales totalled 2958, 60% ahead of '82 results. ■ Metalloy Corp. is the **only aluminum foundry** to receive Ford's Q1 preferred quality award. ■ Volvo US first quarter **sales are a record** 22,501 units.

EUROPEAN STATISTICS

European Registrations — Group A
Western Europe: registration of new passenger cars, 1970-82, units

	France	F R Germany	Italy	United Kingdom
1970	1,296,628	2,107,123	1,363,594	1,087,544
1971	1,468,888	2,151,557	1,434,529	1,298,711
1972	1,637,533	2,142,963	1,470,394	1,647,761
1973	1,745,795	2,031,001	1,449,100	1,661,642
1974	1,524,792	1,693,010	1,280,721	1,268,767
1975	1,482,343	2,106,048	1,054,834	1,194,115
1976	1,858,234	2,312,067	1,187,621	1,285,583
1977	1,906,990	2,561,278	1,219,172	1,323,524
1978	1,944,986	2,663,754	1,194,424	1,591,939
1979	1,976,391	2,623,399	1,397,039	1,716,275
1980	1,873,202	2,426,187	1,530,488	1,513,761
1981	1,834,826	2,330,335	1,805,724	1,484,622
1982	2,056,428	2,155,537	1,672,400	1,555,020

Source: National Sources

European Registrations — Group B
Western Europe: registration of new passenger cars, 1970-82, units

	Belgium	Netherlands	Spain
1970	300,842	432,231	399,171
1971	265,722	402,708	432,669
1972	335,537	432,083	506,453
1973	340,[illegible]42	429,931	595,176
1974	335,937	404,312	575,723
1975	364,781	450,220	572,188
1976	420,669	508,451	619,677
1977	428,806	551,932	662,859
1978	424,267	584,585	654,033
1979	429,096	575,059	620,652
1980	407,236	450,076	574,149
1981	360,273	389,312	505,716
1982	344,615	406,770	439,729[10]

[10] = 10 months

Source: National Sources

European Market Share — Total
Western Europe: market share analysis by manufacturer, passenger cars, 1981 and 1982, percentages

European Producers	1981	1982
Alfa Romeo	—	—
BL	3.7	3.7
BMW	2.7	2.8
Fiat	12.7	12.4
Ford	12.3	12.4
General Motors	8.4	9.7
Lada	—	—
Mercedes-Benz	3.3	3.2
Moto Koz	—	—
PSA	13.2	12.4
Renault	14.0	14.7
Saab	—	—
Seat	—	—
VAG	12.6	11.9
Volvo	1.9	2.0
*Japanese producers, total	9.2	8.9

Source: Autotrend

— Less than minimum market share shown in this column

* This figure represents a total of all Japanese companies

AUTOTREND comprises data banks and automobile demand forecasting models for the United States and major European markets. AUTOTREND is a trademark of James McArdle & Associates. James McArdle & Associates, 48 Grafton Way, London W1P 5LB, England telephone: (0)1-388-4932 Telex: 297320

Single copies of this article are free. Circle 503 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

European Registrations — Group C
Western Europe: registration of new passenger cars, 1970-82, units

	Austria	Denmark	Finland	Ireland	Norway	Portugal	Sweden	Switzerland
1970	127,392	108,427	91,633	52,806	70,226	59,535	203,308	210,626
1971	195,192	103,670	74,907	51,898	81,471	72,539	197,969	235,468
1972	221,624	92,413	100,760	63,811	74,680	77,655	220,752	258,972
1973	186,982	122,043	117,969	75,532	88,984	79,000	225,722	238,678
1974	166,981	78,713	96,097	61,822	90,293	88,213	260,129	202,227
1975	185,167	115,561	117,021	54,036	102,811	84,231	285,328	189,945
1976	225,467	151,747	92,342	70,533	126,997	97,913	312,881	203,834
1977	295,936	141,230	90,077	83,668	145,249	76,485	241,374	234,201
1978	158,279	133,255	80,701	107,555	77,821	53,172	200,874	271,553
1979	214,297	126,952	99,578	95,938	88,866	51,892	215,325	280,102
1980	227,548	73,774	103,167	94,210	95,550	58,357	192,588	280,453
1981	198,659	71,888	104,961	106,074	104,670	79,194	188,522	291,066
1982	194,200	85,405	130,500	72,700	115,573	73,100	218,428	285,200

Source: National Sources

When Toyota gets through reorganizing GM's Fremont, CA plant, it will be the most efficient assembly operation in the US.

WHAT TOYOTA WILL TEACH GM

Toyota chairman Eiji Toyoda and GM chairman Roger Smith tour the idle Fremont, CA plant after signing the joint venture agreement. Toyota assembly techniques will eliminate at least 1300 jobs for the venture as compared to a typical GM plant.

by John McElroy

In April 1981 General Motors opened its Fremont, CA plant to build its new fwd A-cars. Converting the 20-year-old plant from rwd to fwd required extensive changes with modern tooling to ensure it would produce a high quality automobile. The A-car, a well-designed, efficient package, was expected to make major dents in the import-dominated California market.

The plant started out on two shifts employing nearly 4700 people making over 160,000 cars a year. But in short order it became apparent that the A-car would not meet its sales expectations on the West Coast. Operations were cut back to one shift, and around 2200 employees were let go. One month later GM decided to close down the operation entirely—only 11 months after it had completely renovated the plant.

Unfortunately, GM found that it couldn't justify using the plant to supply other parts of the country where the A-cars were selling. It simply cost too much to produce the great bulk of A-car components in the Midwest, ship them to the West Coast, then turn around and ship the cars back East. It was a hard lesson in the high costs of inventory control, a mistake neither GM nor the domestic industry is likely to repeat again.

In the last four years, three automobile assembly plants in California have closed, and Ford's San Jose plant will close this month.

Enter Toyota. The Japanese automaker was looking for a quick and easy way to stifle a growing protectionist movement in the US. Concurrently, GM was interested in bringing a subcompact car to market quickly and inexpensively. Importantly, it would have to be a car that would count towards Corporate Average Fuel Economy (CAFE)—an import is not eligible.

The result: a joint venture which will combine the biggest Japanese manufacturer with the biggest American sales and marketing network. The plant will be run by Toyota's managing director, Tatsuro

(Continued)

ASSEMBLY PLANTS COMPARED

	Fremont, CA	Typical Japanese Plant	Typical New GM Plant
daily production	800 cars	1000 cars	1200 cars
size	2.9 million ft² *269,700 m²*	1.5 million ft² *139,500 m²*	3.0 million ft² *279,000 m²*
direct labor	1050	1112	2600
indirect labor			
hourly	725	625	2125
salary	325	175	525
total employment	2100	1912*	5250*
including stamping	2500	n/a	n/a
total hours	16,800	15,300*	42,000*
including stamping	20,000	n/a	n/a
manhours labor/car	21	15.3*	35.0*
including stamping	25	n/a	n/a

*does not include stamping

source: Harbour & Associates

COMPONENT SOURCING AT FREMONT

Japanese Sourced
- engines
- transaxles
- axles
- suspension components
- CV joints
- instrumentation

American Sourced
- soft trim
- seats and foam
- springs
- wheels & tires
- stampings

Source: Harbour & Assoc.

By sourcing the 'big ticket' items from Japan, Toyota will be able to further reduce the cost of the car it will build for GM.

MANPOWER SAVINGS AT FREMONT

Title	Amount Reduced
Quality Inspectors	250
Relief Men	
mass relief	280
lower absentees	220
Materials Handlers	250
Repairmen	250
Union Reps	40

Source: Harbour & Assoc.

These are six of the major categories where Toyota will be able to eliminate jobs. Further reductions will come from flexible work rules which will allow one worker to perform several jobs.

Toyoda, and will build a new fwd subcompact (based on the Corolla) which will be distributed by Chevrolet.

The $300 million investment will be split down the middle, with GM putting up its Fremont plant and $20 million, while Toyota kicks in $150 million. Industry sources estimate this will save GM $1.5 billion in developing and tooling a new fwd subcompact on its own.

More impressive, however, is how Toyota plans to make the plant a profitable operation. By using half the employees of a typical US assembly plant, including an on-site stamping plant, the venture will save over $500 a car.

Moreover, at least half of the components of the car will come from Japan, further lowering the manufacturing cost.

Inventory logjams will be avoided by shipping components in densely packed containers. When Toyota gets through reorganizing GM's Fremont plant it will be the most efficient assembly operation in the US.

Toyota can use half the employees because of a better quality system, lower inventory levels and different work practices, says James Harbour, a management consultant in Berkley, MI.

Specifically, Harbour estimates that by making each hourly employee responsible for his own work, Toyota will be able to eliminate 250 separate quality inspectors. And this, combined with Toyota's painstaking attention to quality, will eliminate 250 repairmen.

Lower inventory levels, combined with just-in-time delivery, will eliminate another 250 material handlers, as well as the expense incurred with conveyors and forklift trucks. Flexible work rules will allow employees to perform several jobs and not just those that are narrowly defined by lines of demarcation.

By switching from tag relief to mass relief, Toyota will eliminate 280 relief men, and by driving absenteeism to typical Japanese levels, they will eliminate another 220 relief men. Getting rid of non-working union representatives on the company payroll will eliminate another 40 people.

Establishing an on-site stamping plant will allow just-in-time delivery of body panels. This will reduce inventory levels which in turn reduce material handling. And less material handling results in less scrap, rework and repair.

Harbour also says that the joint venture's stamping plant will be equipped with presses with rolling bolsters so that dies can be changed in 10 minutes instead of the 8 hours that is typical of an American stamping plant. These quick die change features will allow a further reduction in inventory levels and will require fewer workers.

The key to Toyota's success, says Harbour, will lie in its ability to make this a family operation.

"Will Toyota be able to hire a workforce that will fit into the total organization as it does in Japan?" he asks. "Will they be able to train them the Toyota way?"

At this point these questions remain unanswered. Yet to be resolved is if the FTC will even allow GM and Toyota to skirt anti-trust laws, especially over the vehement opposition of Chrysler, Ford and AMC. Even more ominous is the UAW's declaration that it will "go to war" if the union is not represented at the Fremont plant.

But if the planned operation does go through, this joint venture promises to become a case study for the rest of American industry. Harbour says it cost the domestic automakers about $6000 to build a subcompact and that the Japanese have about a $2000 landed cost advantage. In other words, while the domestic subcompacts lose money, their Japanese counterparts are earning profit levels equal to full-size American cars.

This advantage, says Harbour, is largely the result of an efficient use of resources, not better technology or lower wage rates. And this is why GM wants Toyota to teach it how to build small cars profitably. ■

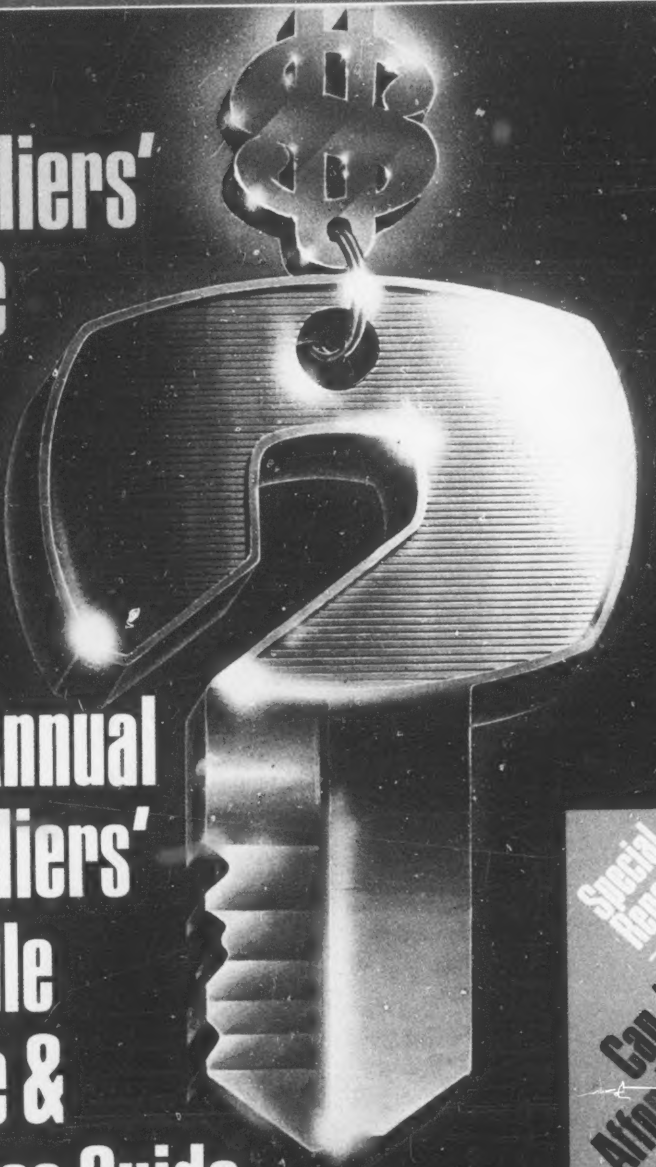
Single copies of this article are free. Circle 506 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

CHILTON'S 6/1983

AUTOMOTIVE INDUSTRIES

C 2150-3A 6/20/83

1983 Suppliers' Issue



8th Annual Suppliers' Profile Issue & Source Guide

Special Report!

Can Automakers Afford To Buy American?

BUY AMERICAN
BUILD AMERICA!

AUTOMOTIVE INDUSTRIES

June, 1983/Volume 163, Number 6

FEATURES

5 8th Annual Financial Analysis
Materials, parts and components companies have fought through the toughest economic period in recent memory. Here their results are analyzed.

7 Short-Term Forecast Hopeful For Europe
The most exhaustive analysis ever published on the European motor industry predicts changes in the role of the two American multinationals—GM and Ford.

10 Can Automakers Afford To Buy American?
Each year foreign suppliers take a bigger share of the US market. Do domestic suppliers have the capabilities to survive?

12-D 'Qualified' Optimism For New Vehicle Sales
From a sampling of forecasted sales and production figures by major research firms and Detroit's Big Three is gleaned universal but guarded optimism.

13 MIT & Harvard Track . . . The Metamorphosis Of An Industry
MIT and Harvard are both finalizing high-caliber, massive studies of the US auto industry. Here's a sneak preview, offering new insights and uncovering new trends.

16-D The Long Haul Back To Prosperity
Four years after cresting the biggest sales peak in its history, the truck and equipment industry is working hard to leave the bad 1982 times behind.

16-I NHTSA's Peck Resigns, Who Wants The Job?
With Raymond Peck's resignation, whoever takes the helm at NHTSA faces gale force Congressional winds. Peck tells *AI* the 'whys' and 'what fors.'

17 Automotive OEM Source Guide
Our 8th annual Source Guide puts at your fingertips the names and addresses of hundreds of suppliers to the automotive industry.

54 International Statistics
AI checks out diesel car passenger production by country and manufacturer.

57 Supplier Profiles
The Supplier Profiles provide an in-depth look at key suppliers with information on specific products, specific divisions and company capabilities.

126 Views Differ On Automated Manufacturing
A recent European conference made it clear that there are marked differences on how much automation, how soon.

NEWS & DEPARTMENTS

1 Editorial: We Have To Make It Happen
3 Marketdata
4 Newsline
4-K Detroit: A Lesson For Detroit
129 Business Managers
130 Advertisers' Index
133 Reader Information Cards

COVER

After a mammoth effort that some staffers (E.L. & M.M.) thought would never end . . . here's June!

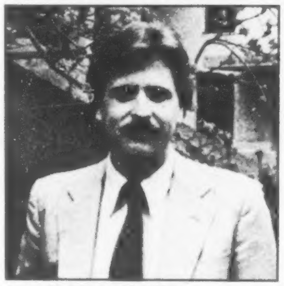
NEXT MONTH

From Europe and America, *AI* presents specifics on how racing improves the breed.

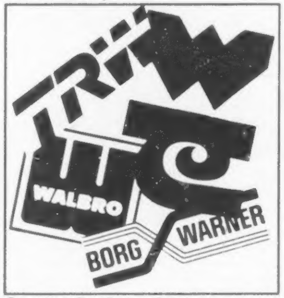
QUOTABLE

James A. Baker, General Electric executive VP, on the US automobile industry—"The Japanese didn't steal our world dominance in that industry from us. It was an *inside* job. The Japanese merely studied our production technology and then accelerated it . . . while we were learning roller disco and collecting quiche recipes."

Buy American—P. 10


Auto Studies—P. 13

Van Sales Up—P. 3



Supplier Profiles—P. 57

AUTOMOTIVE INDUSTRIES (ISSN 0273-656x) magazine is published monthly by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: United States and US Possessions—$30.00 per year, $55.00 for 2 years; Canada and Foreign—$75.00 per year. Air rates on request. Single copies and back issues on request. All subscription orders must be accompanied by cash or check, along with complete information for classification, including the title of the individual and the product the company manufactures. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. POSTMASTER: Send address changes to AUTOMOTIVE INDUSTRIES, P.O. Box 2055, Radnor, PA 19089. ©Chilton Company, 1983. Permission to photocopy for internal use or the internal use of specific clients is granted by Chilton Company for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $1.00 per copy of the article, plus 25¢ per page is paid directly to the CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to The Editor. (0273-656x/83 $1.00 + 25¢)

8TH ANNUAL FINANCIAL ANALYSIS

by Ira G. Black & Lance A. Ealey

It's been tough. No question about it. But no one's been dragging their feet.

Companies are running lean and have been paring costs. Breakeven points have been lowered dramatically. So, as demand picks up, profits should rise and rise quickly.

Most feel the recession, certainly for automotive, has bottomed out, and that for at least the next few years there will be a slow but steady upward growth curve as the nation gets back to work and the recession eases worldwide.

Improvement across the board is predicted by nearly every supplier segment as the economy and auto production begin to rebound.

Over the past year it's been a bad news/good news scenario for **the tire industry.** Orders remained close to even with the previous year's figures. OEM orders were down. But replacement market orders were up. It is worth noting the difference since the replacement tire market is close to three times the size of the OEM tire market.

Again, as has been the case for the past couple of years, tire makers have been fiscally vigilant, continuing to whack away at overhead and attempting to become more efficient in all areas, including production.

Two things stand out particularly. One is that there has been much chomping at the bit to diversify away from tires on the part of quite a number of companies. So far, though, not much has been done about it. The other is that, because of careful cost containment in recent years, most tire companies supplying the OEM are ready to bounce quickly into nice profit positions as soon as car production works its way back to respectable numbers.

Producers of lead and zinc are figuring on '83 turning out to be a decent year—at least as far as their OEM automotive business is concerned. While reasoning that by year-end the auto OEM could rebound by a healthy percentage, they also are aware that any rebound whatsoever is starting from an exceptionally low base point. Producers say prices for zinc, nickel, lead and copper will likely take some move upward (even if modest) over the next several months.

Nickel and copper, especially, were hard hit earlier as demand plunged. Nickel owes its slow but growing pickup to an improvement in production of specialty steel, while copper can trace at least part of its upswing to the modest improvement in automotive.

For **aluminum producers,** '82 is sure to go down as a year to forget. Profitability was absolutely dismal. But '83 augurs to drag the industry out of its deep trough. And leading it out will be automotive, as well as housing, if the sluggish recovery holds up. As aluminum content in cars continues to rise, the auto industry remains one of aluminum's bright spots.

Suppliers of automotive parts and components, like companies in many other industries, have gone all out to trim overhead and other fixed and variable costs in an attempt to lower breakeven points.

The result has, in some cases, been dramatic. For while costs have been dropping (or at least not increasing significantly) car production has been on the upswing, with the result that profitability of these

(Continued)

Selected Steel Suppliers

[1]—Figures include Marathon Oil purchase.

Company	'82 Net Sales ($ millions)	'82 Net Earnings ($ millions)	% Return on Sales
U.S. Steel[1]	18,907.0	(361.0)	(1.9)
Armco	5,427.9	(345.1)	(6.4)
Bethlehem Steel	5,260.3	(1,469.6)	(27.9)
LTV	4,776.8	(154.9)	(3.4)
National Steel	3,044.2	(462.8)	—
Inland Steel	2,844.0	(118.8)	(4.2)
Republic Steel	2,738.2	(239.2)	(8.7)
Wheeling-Pittsburgh	775.4	(58.8)	(7.6)
Kaiser Steel	734.9	2.7	0.4
Nucor Corp.	486.0	22.2	4.6

Selected Parts & Component Suppliers

[1]—Figures represent company's fiscal year
[2]—Includes sales from discontinued operations of 10% or more

Company	'82 Net Sales ($ millions)	'82 Net Earnings ($ millions)	% Return on Sales
ITT	15,958.4	702.8	4.4
Rockwell Int.[1]	7,395.4	331.6	4.5
TRW	5,131.9	196.3	3.8
Bendix[1]	4,092.1	132.8	3.2
Borg-Warner	3,195.3	167.4	5.2
Textron	2,936.0	84.4	2.9
Eaton	2,452.6	(189.6)	—
Dana	2,422.9	51.6	2.1
Colt Ind.	1,691.9[2]	(161.4)	—
Cummins	1,587.5	7.7	0.5
Timken	1,014.4	(3.0)	—

companies over both the long and short term could show considerable progress.

However, suppliers of all kinds are under intense pressure by automakers to restructure in order to aid in the struggle for increased worldwide competitiveness. Car builders want (make that demand) higher quality than ever before. They expect more frequent and more tightly scheduled deliveries. And they insist on cost control by whatever means—relocation, out-sourcing, manufacturing efficiencies, technological inventiveness.

The next three years will be critical for OEM automotive suppliers.

As with many industries, **plastics** is looking for autos and housing to lead the nation out of recession. The trend to greater use of plastics in cars (as well as some new technology coming on stream a la GM's Fiero) bodes well.

Technological achievement is key here as plastics companies continue to vie for growing portions of the lucrative automotive pie.

Declining raw materials costs are a big plus for the industry as margins widen. On the down side there remains some concern about over-capacity both in the US and elsewhere.

Think '82 was a disaster for **machine tools?** Many in the industry think this year could be even worse.

About 20 years ago, offshore-built machine tools accounted for only about 4% of total US consumption. Today, that figure is close to 33%. At the same time, US builders are exporting less, currently accounting for only about 7% of worldwide consumption. Two decades ago the number was nearly 25%. Japan is now top dog as the globe's No. 1 machine tool maker.

Used tools, too, are putting a dent in US production. As tool-using companies have cut back or gone under, a deluge of preowned machinery has hit the market.

Cancellations of previous orders have helped to create additional glut in tool inventories; plus, there was inventory buildup to start with.

Couple this with decreased demand due to dismal capacity utilization rates and a veritable drought in tool order backlogs.

But with all the gloom, it must be noted that machine tool builders for the most part have not been caught napping. They've slashed labor forces, closed outdated facilities, cut product lines and unloaded inventories wherever possible.

In addition, the stage is set, once recovery is fully in motion, for an avalanche of high-technology manufacturing systems which combine machine tools, electronics and computer software. Flexible manufacturing systems, factoring in computers, machine tools, material handling, inspection and even assembly, are the wave of the future and offer healthy growth for the industry—and significant productivity gains for users.

Demand for **steel** plunged. Prices collapsed. Capacity utilization sank. Production tumbled.

All this happened to the steel industry in 1982. And all in all it lost a whopping $3.3 billion last year.

Add to this a labor union stance that has seemed determined to kill the goose; plant and equipment right out of a Charles Dickens novel; market share being eaten alive by imports—and you have a pretty sorry state of affairs.

For comparison purposes, look at some milestones.

In 1946 a smaller industry produced over 66 million tons of raw steel. In 1973 it turned out nearly 151 million tons. Last year it poured less than 73 million tons.

Ten years ago steel industry employment costs per worker were about $7.68; last year they were something over $22. So production has been halved while labor rates have roughly tripled.

Perhaps it is less of a surprise, then, to learn that over the same period of time import penetration, as a percentage of apparent supply, went from just over 12% to more than 22%.

Is there hope? Most certainly. Should wage rates moderate and capacity be brought more into line with demand, and if modernization proceeds apace, aided by an improved economy, the US steel industry could be on the high road to profitability and world competitiveness. ■

Single copies of this article are free. Circle 501 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

Selected Tire & Rubber Suppliers

1—Figures represent company's fiscal year.
2—Reflects at least 10% extraordinary credit.

Company	'82 Net Sales ($ millions)	'82 Net Earnings ($ millions)	% Return on Sales
Goodyear	8,688.7	264.8	3.0
Firestone[1]	3,869.0	6.0[2]	0.2
Goodrich	3,005.3	(32.8)	—
General Tire[1]	2,061.7	19.4	0.9

Shipments & Orders For Machine Tools

Date	Shipments	Net New Orders
1977	$2,280,750	$2,996,900
1978	3,013,450	4,344,000
1979	3,876,550	5,542,700
1980	4,691,750	4,661,700
1981	5,092,750	2,944,950
1982	3,607,200	1,498,550

Source: NMTBA Figures in thousands (000)

Selected Plastics Suppliers

1—Reflects at least 10% extraordinary credit.

Company	'82 Net Sales ($ millions)	'82 Net Earnings ($ millions)	% Return on Sales
Dupont	33,331.0	894.0	2.7
Union Carbide	9,061.5	309.7	3.4
Celanese	3,062.0	(34.0)	—
Hercules	2,469.0	98.4[1]	4.0
Owens-Corning Fiberglas	2,373.5	29.7	1.3

Selected Nonferrous Metal Suppliers

1—Reflects at least 10% extraordinary credit.

Company	'82 Net Sales ($ millions)	'82 Net Earnings ($ millions)	% Return on Sales
Alcoa	4,647.6	10.8[1]	0.2
Alcan	4,644.0	(58.0)	—
Martin Marietta	3,526.5	91.6	2.6
Reynolds	2,980.9	7.7[1]	0.3
Kaiser	2,911.5	(115.0)	—
AMAX	2,415.5	(390.1)	—

SHORT-TERM FORECAST HOPEFUL FOR EUROPE

What is claimed to be the most exhaustive analysis ever published on the future of the European motor industry predicts changes in the role of the two American multinationals, Ford and GM, and looks at the short-term future for Europe's carmakers.

by Peter J. Mullins

In a recent report on the future of the European motor industry, Krish N. Bhaskar, professor of finance and accounting at the University of East Anglia, made some interesting speculations about the future of the two big American multinationals operating in Europe, Ford and GM. (Prof. Bhaskar is acknowledged as probably the leading independent forecaster for the motor industry in Britain.)

Noting that Ford had since 1979 been much more profitable in its international operations than in its home market, Bhaskar foresaw the possibility that the US parent would gradually become less of a parent company and more of a division playing a role in a worldwide production and marketing plan. One of the critical assumptions in this projection is that the US capital market will continue its unwillingness to finance some $5 billion of short- and long-term debt to Ford.

Bhaskar sees Ford's increasingly close association with Toyo Kogyo (Mazda) as a strength. The two companies comprise one of the few groups developing an integrated product and production plan to encompass *all* the world markets.

This would be merely an extension of what Ford has done so successfully in Europe. This strategy could make Ford profitable worldwide, but it could also mean that North American production facilities would decline in importance.

GM's case is different, says Bhaskar. GM foresaw downsizing in the US (which Ford didn't) and has been able to keep its American operations under control. The group's overseas operations, particularly the European ones however, have dragged it into a very uncomfortable situation. In the UK, GM's subsidiary Vauxhall, has been a consistent money loser over the past few years. Worse yet, Opel slipped into unprofitability in 1980 and has stayed there.

This has caused GM to take a much closer interest in its overseas activities and, in Europe, to integrate and rationalize. The complete model ranges of Opel and Vauxhall have now been pooled and GM is concentrating on bringing both back to profitability. Profits are the thing, says Bhaskar. GM must become financially healthy to enable it to contine integrating its worldwide interests and following the path Ford has taken.

On the British motor industry, Bhaskar believes the worst of the crisis is over. But it is "still a fragile flower that could be crushed by ill-thought government actions, or from management or workforce problems." He expects BL to reach peak financial pressure in 1987-8 when, after a brief boom starting next year, he believes there will be a sharp decline. He warns against any euphoria, if and when the

(Continued)

European Car Market Shares (excluding Greece)

	1979 %	1980 %	1981 %	1986 %	1986 volume in millions
Renault + Volvo	15.5	16.8	15.9	15.0	1.8
Ford	12.0	11.1	12.3	13.0	1.6
Peugeot	17.1	14.6	13.2	12.5	1.5
Fiat	10.0	11.8	12.7	11.2	1.3
VAG	12.2	11.8	12.6	12.5	1.5
GM	9.6	8.7	8.4	12.0	1.4
BL	4.1	3.5	3.7	5.0	.6
Mercedes	3.0	3.3	3.3	3.5	.4
BMW	2.5	2.5	2.7	2.8	.3
Japanese	7.3	9.8	9.2	11.0	1.3
Market size in millions	10.3	10.0	9.7	12.0	

Source: K. Bhaskar

European market shares projected to 1986. It is considered that to limit Japanese share to 11%, strict import controls will be needed. Allowance has been made for further Japanese investment in European manufacturing . . . but not more than one major plant, or one or two small ones.

Analysis Of Production

	Plant Locations	Estimated Capacity in 1982 (millions)	Prod'n in 1981 (millions)	Change in capacity over last decade	Automation	Productivity	Industrial Relations
Pan-European							
Ford	Several	1.7	1.3	Increase	Fair/Good becoming better	Fair	Fair/Good
GM	Several	1.6	.9	Recent increase in 1982	Fair becoming better	Fair	Good
Peugeot Group	France, Spain, UK	2.3	1.6	Slight expansion followed by reduction	Fair becoming better	Poor	Poor
Nationals							
Renault	France, Spain	2.0	1.6	Small increase	Fair and improving	Fair	Poor
VAG	Germany	1.6	1.2	Reduction and switch to US	Fair to Good	Fair	Good
BL	UK	.8	.4	Reduction	Good by 1983	Poor	Fair becoming better
Fiat	Italy	1.5	1.0	Reduction	Good but patchy	Poor	Poor
Specialist Producers							
Daimler-Benz	Germany	.6	.5	Increase	Fair	N/A	Good
Alfa Romeo	Italy	.3	.2	Increase but some retrenchment	Poor	N/A	Poor
Volvo	Sweden, Netherlands	.4	.3	Takeover of DAF	Poor/Fair	N/A	Good
Saab	Sweden	.1	.1	—	Poor/Fair	N/A	Good
BMW	Germany	.4	.3	Increase New assembly plant announced	Poor/Fair	N/A	Good

Source: K. Bhaskar

group becomes profitable in 1985-6.

Probably the most important medium-term factor for BL is its link with Honda. By sharing development and engineering costs, both companies will be able to produce a better car than they could on their own. Eventually they may cut costs further by splitting the production of some of their models . . . perhaps using a Honda powertrain with a BL bodyshell.

The BL/Honda relationship puts BL in front of all its main European competitors seeking international links. Development of the XX project—a joint Honda/BL executive car to replace the Ambassador and Rover ranges and put Honda into the luxury car market for the first time—is well advanced and will be produced in world volumes of around 350,000/year.

Both companies will have slightly different versions. BL will make the Honda and BL variants for the whole of Europe. Honda will make variants for Japan. The US market could be supplied by either company, or from Honda's new US plant.

It is a safe bet that following the success of the Acclaim, both companies are confident about their cooperative policy and have a healthy respect for each other. Future projects are speculative, but could include: a reworked and face-lifted Metro with a Honda powertrain; the assembly (as with the Acclaim) of a small car below the Metro; a BL restyled Honda Prelude to bring this sports coupe up to European standards of roadholding, handling and performance; a joint venture to tackle the Cortina/Sierra market; or another joint venture to make a cheaper variant of the XX to compete in the large car segment against lower-spec cars like the Granada.

Looking at Europe generally, Prof. Bhaskar divides the twelve carmakers into three categories: pan-European operators; nationals; and specialist producers. The accompanying table reviews some of the strengths and weaknesses of these big twelve.

None of the European car producers is yet sufficiently automated to meet Japanese competition, he says. The trouble is that in the present economic climate most are unable to finance heavy plant investment in sophisticated automation.

Of the three pan-Europeans, Ford and GM are clearly in the strongest situation. Ford Europe, as we have seen, is currently profitable and GM's European companies could be financed by the US parent if they got into trouble . . . whether Ford's could

European Production In 1986
(000s)

	Cars	Car-derived Vans	Vans	Trucks	Exports (ex-Europe)	Total Production
Renault & Volvo	1,800	123	54	60	200	2,237
Ford	1,560	41	102	40	100[c]	1,843
Peugeot Group	1,500	82	—	0	275	1,857
Fiat/Iveco Group	1,344	41	95	56	125	1,661
VAG and MAN	1,500	21	102	28	100 + 200[d]	1,951
GM	1,440	25	68	36	50	1,619
BL and MSA[a]	600 + 100[b]	25	41	20	80	866
Daimler-Benz	420	2	61	80	100	663
BMW	336	0	0	0	40	376
Japanese	1,320	41	122	28	—	—
Other	80	10	32	53	25	100[e]
Total	12,000	411	677	401	1,295	13.173

a. Spanish Land Rover.
b. Assumes an additional 100,000 Honda assembled/joint production vehicles made for export to Europe
c. Assumes some exports from Europe to the US.
d. These are kits exported to the US.
e. This line does not add up as it includes imports into Europe.
Source: K. Bhaskar

Analysis of main European carmakers in terms of production. Further rationalization could take place through the '80s. Renault and VW/Audi (VAG) show signs of getting closer together, as do Fiat and Peugeot. A possible future scenario could have Renault, VW and Volvo in a block of companies; and Fiat, Peugeot and Saab in another. BL's future would be tied to Honda, and Daimler-Benz and BMW would remain independent specialist carmakers. Alfa-Romeo could join the Fiat/Peugeot group or go it alone with Nissan.

Forecast production from major European car producers in 1986 to meet a predicted demand of 12 million cars plus trucks. Allowance has been made for a deteriorating balance of trade. During this time the prediction is that there will be a big switch of component purchasing from Europe to the Far East.

or would is another matter. Both are expansionist and have their eyes firmly on a world role.

Peugeot as a group is big, with interests in the UK and Spain. But both these outlying areas are giving the group some trouble at the moment and Peugeot as a whole is unprofitable.

Both Peugeot and Renault will be affected by the adverse economic climate in France. Both compete strongly in the French market but are linked in various joint ventures. Renault's strategy must be to hang onto what is has on both products and markets. Bhaskar feels that Peugeot is over extended in its three marques (Peugeot, Citroen and Talbot) and cannot maintain all three.

Fiat is currently concentrating on Europe, having trimmed away some of the peripheral activities in various parts of the world, including the US. It is integrating production with Polski-Fiat in Poland which now makes all the 126 models. There is a danger that Fiat could be affected adversely by government policies which are tending to use the motor industry to regulate the economy. Successive British governments did the same in the '50s and '60s with disastrous results.

VW retrenched in Europe some years ago and expanded heavily in the US. Recently, it has suffered badly in America and has mothballed one plant (in a nearly completed state) which was recently sold to Chrysler. However, VW still has plenty of ideas and cannot be underestimated. Although recently it has produced one or two models with less styling appeal than usual, its marketing philosophy and model range are excellent. It also has a strong Audi division catering to the top end of the market.

Daimler-Benz remains strong, but should be careful that in spreading into the smaller car market (with the new 190) it does not affect its big luxury car image.

BMW amazingly competes with a series of products in various market segments. However, because of price, BMW is classified as being in the large car sector. Its new, highly-automated car plant should add to its competitiveness. Both Mercedes and BMW are actually volume producers at the bottom end of their ranges.

The remaining companies are planning to survive through links and collaborative ventures. Renault and Volvo will get closer together, Volvo's new small car being built up on a Renault 9 (Alliance) floor pan and Renault's new big car being modelled on a Volvo.

Alfa Romeo has agreed to be tied closer to Fiat, and Saab has a strong technical link with Lancia which is likely to lead to a replacement for the Saab 99 by a Lancia fwd product using a Saab powertrain.

Prof. Bhaskar has examined market shares of leading European companies and projected a scenario for 1986. This shows Renault plus Volvo in the lead with a share of 15% but having slipped back from nearly 17% at their peak. Ford should improve its market share from 12% to 13% and Peugeot will probably slip back from 13.2% to 12.5%.

Fiat will also slip back marginally, and VW, Mercedes and BMW will hold or slightly improve their positions. The big gainers will be GM, which is likely to boost its market share from 8.4% to 12.0%, and BL from 3.7% to 5.0%.

The total market will, if the predictions are correct, go from 9.7 million in 1981 to 12.0 million in 1986, so on the whole the scenario is hopeful.

Prof. Bhaskar makes it clear that the scenario is speculative and depends on the Japanese producers being held at bay. He thinks they will be, but by restrictions rather than by market forces. ■

Single copies of this article are free. Circle 502 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

CAN AUTOMAKERS AFFORD TO BUY AMERICAN?

Detroit's rallying cry is, "Buy American." But each year foreign suppliers grab an increasing share of the US market. Even foreign automakers assembling cars in the US source many components overseas, or even bring foreign suppliers over here. Yet domestic suppliers have a number of strengths they are just beginning to tap.

by John McElroy

American automotive suppliers are accused of having become so uncompetitive that they won't jump at opportunities even when they're dangled in front of them.

Specifically, BMW and Honda of America complain that they can't get American suppliers to do business with them. To others, this just seems to fit the perception that "Made in the USA" means poorly made, high priced parts that are never delivered on time. If true, this presents a serious, some say fatal, challenge to the domestic supplier industry.

Last fall, while speaking to a group of reporters in Detroit, John Cook, ex-president of BMW of North America, complained that his company wanted to buy more American made components but couldn't interest US suppliers in selling them what they wanted. Though small, BMW's total sales exceeded $1 billion in the US in 1982. So far it has bought NC painting robots from GMF Robotics, and forged aluminum wheels, leather, catalysts, windshields and A/C units from other American companies.

"We have not been as successful as we would have wanted in attracting US suppliers," says a BMW spokesman. "We spend about $35 million on US parts, and we'd like to spend another $10 to $11 million."

A general manager at Honda of America says that the Accords built in Marysville, OH use many Japanese components that could be sourced here but aren't because they are too expensive or are shipped in many pieces instead of subassembled.

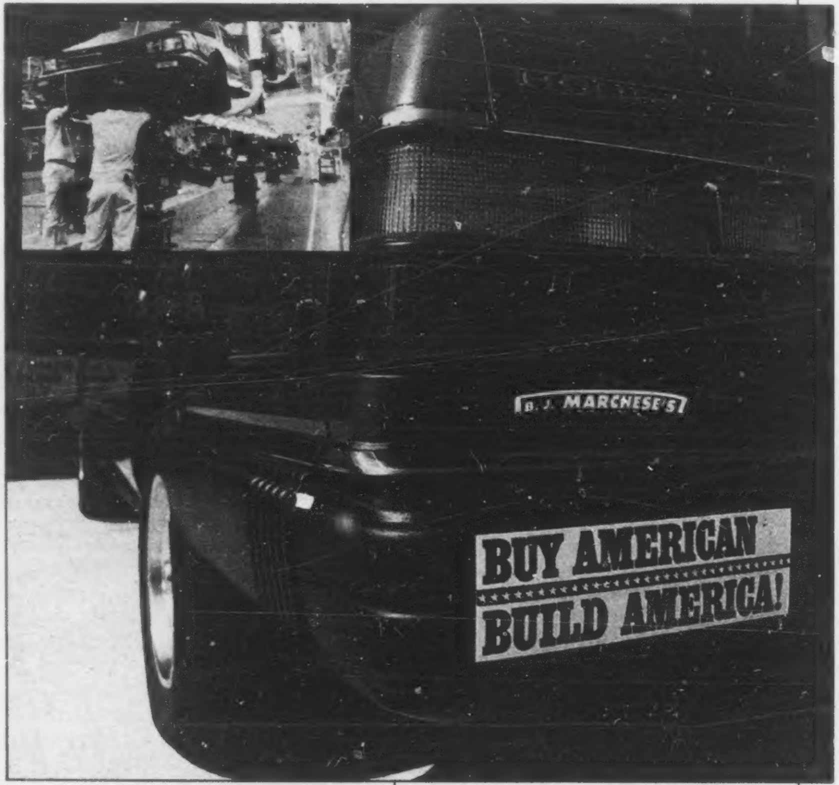
Remarks like these earn stinging rebukes from American suppliers, but the impression persists that they are faced with seemingly insurmountable competition.

An Endangered Species?

Although difficult to document, the US supplier base has been hard hit. Not only is the total volume of car sales substantially below what it was 5 years ago, imports now capture about 30% of the market that is left. Even the aftermarket, traditionally less cyclical than OEM business, is seeing inroads made by foreign suppliers.

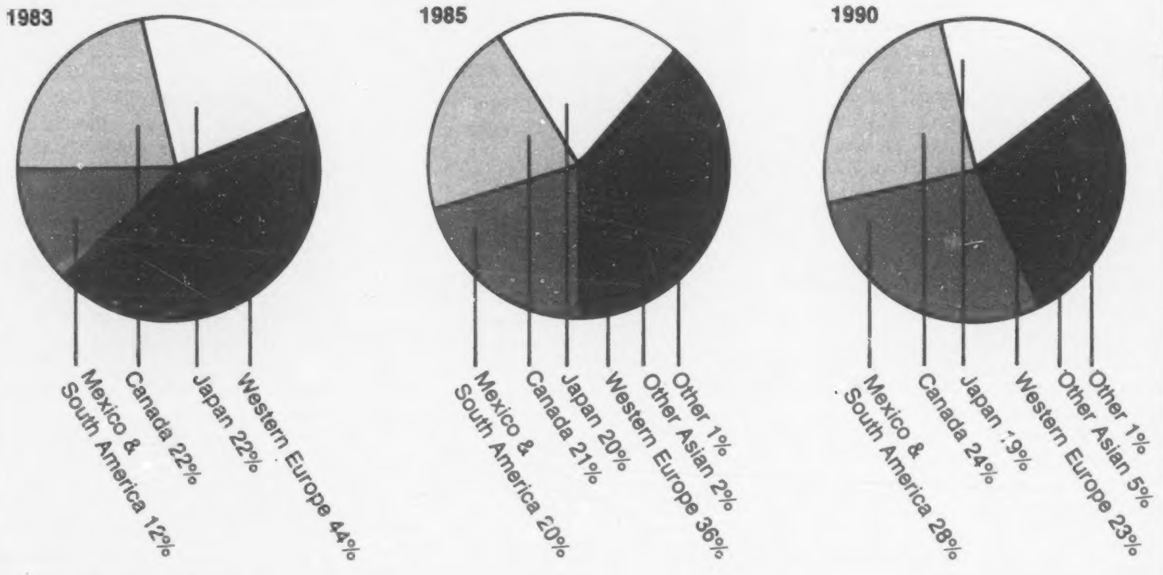
In addition, the domestic automakers are buying an increasing amount of offshore parts, particularly those built in smaller volumes. As the US automakers build a greater variety of products to meet changing customer demands, economies of scale are often not enough to justify capital investments in this country.

And even when foreign automakers, such as Nissan and Honda, assemble vehi-



American built Hondas have 50% local content, measured on a dollar basis, although this also includes components from Japanese suppliers located close to the Marysville, OH plant. Bellemar Parts Industries, for instance, located about ¼ mile from the plant, supplies seats, fuel lines and exhaust components. Bellemar is jointly owned by Honda and two other Japanese companies. Says an American Honda Motor Co. executive, "We will increase our endeavors to build local content."

Latin America Gains As Source For US Car Parts
foreign parts—US purchases



Source: Arthur Andersen

cles in the US, they still import 'big ticket' items like the powertrain. Worse still, many of their suppliers come into this market with them.

"In Japan, suppliers are part of the corporate family," explains Robert Perkins, VP of Chrysler Far East. "And as the Japanese manufacturers come to the US, they will bring their families with them."

All told, US auto suppliers are losing ground to offshore competitors which enjoy lower wages, government subsidies and even technological advantages.

"Generally there are three reasons for us to look for sources overseas," explains J. C. Hitchcock, director, supply policy and planning at Ford. "One is technology of proprietary products. A second is those instances where we are in a foreign market and must develop local industry either to put parts into the vehicles we build in that market or as compensating exports for materials we ship to that country. The last reason is for lowest cost—to minimize the cost of our domestic vehicles."

Presently, Ford and Chrysler use about 5% foreign content in the cars they build. For American Motors, and its heavily French-sourced Alliance, the figure is much higher. General Motors currently has about 2% foreign content, but that is expected to change dramatically. Although GM doesn't expect to buy larger quantities of foreign parts, it could source about 500,000 automobiles from Isuzu, Suzuki and its joint venture with Toyota. Overall, offshore suppliers are projected to enjoy a 2% per year growth rate in the US to the end of the decade.

But this doesn't mean that the US supplier base will entirely disappear. Indeed, there are a good many American suppliers, both large and small, that can compete with off-shore suppliers. And others are beginning to realize that they enjoy certain advantages that will cement their share of the domestic market and even open up opportunities overseas.

Hope On The Horizon

With improved inventory management, application of statistical quality control and longer term contracts which allow them to invest in new equipment, domestic suppliers are becoming more competitive. They also don't have language barriers, import duties or ocean transportation costs to overcome, factors which will grow in importance with each step the domestic industry takes towards just-in-time inventory control and manufacturing flexibility.

"There are certain commodities that we know are inherently unattractive to buy off-shore, such as items that are subject to late design decisions like soft trim," says Hitchcock from Ford. "Another category would be items that are susceptible to shipping damage, or those that have a low value per pound of material, like iron casting or batteries."

And when strategic planning is taken into account, some of the growing movement in off-shore sourcing may not be as permanent as it seems at first glance.

"A lot of what appears to be off-shore sourcing is really the positioning of Ford and GM for the longer term off-shore market," explains Martin Anderson, executive officer of the Future Of The Automobile program at MIT. "When you have a bunch of fragmented markets which may take 20 years to mature, you still want to get in there before someone else beats you to it. But if the local market doesn't have enough volume, you make that volume by shipping back to the US. This off-shore movement would occur even if the US was a very efficient place to do business. Gradually the home market volume grows to the point that shipments to the US will cease."

Anderson predicts that off-shore sourcing will reach a plateau in the next few years. Moreover, he and other analysts see the domestic automakers relying less on vertical integration and more on out-sourcing (subcontracting), a move which could provide more business opportunities for supplier companies.

"The US market will continue to be the biggest and richest in the world for a long period of time, so you don't want to deploy all your facilities away from the US," Anderson says. "The auto companies can out-source work even at unionized supplier companies and get wage rates at the $15 to $17 an hour level. And if it's a nonunionized company, it may be somewhere around $12 an hour with fringes, which is Japanese-style labor rates."

Others in the US supplier industry feel that they can help the domestic automakers with more than just lower wages.

"The only way a supplier stays in business, irrespective of where the competition comes from in this volatile automobile business, is to be a creative, innovative technological leader," says Dick Ford, director of automotive programs at the Garrett Corp. "There are about 18,000 engineers in the US supplier indus-

(Continued)

try that represent a source of talent which can't be ignored. They're a source of brain power that justifies our being in business."

And though they hate to admit it, Garrett and other suppliers are also a source of risk capital. In other words, suppliers can shoulder the risks in a new market. If it fails . . . too bad. At least it's not going to hurt the automakers. However, this often means that suppliers have to be at the forefront in technology.

One of the most successful small companies supplying the auto industry around the world is Donnelly Mirrors of Holland, MI, which also has a plant in Ireland.

"We have virtually all the business in day/night mirrors in the US. In Europe we have competition from two German companies and in Japan its two or three companies. But we've been able to compete effectively in those markets," says Jim Kneister, VP administration and chief financial officer for Donnelly.

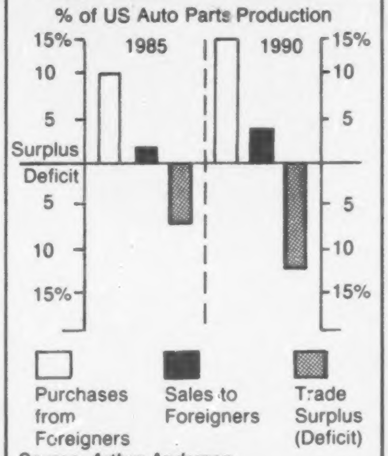
Competing Overseas

"We're late getting into the export market, so we'd better not be clumsy about it," states Richard P. Hervey, of Sigma Associates, a management consulting firm. "A company must be committed to doing business in an overseas market and demonstrate its committment by establishing an office in that country, investing to develop the market and meeting that particular market's needs with the right products."

The key to Donnelly's success, says Kneister, is strict attention to cost reduction and quality control. "We've been using behavioral techniques with our employees, such as our Scanlon Plan in cost reductions, and we've been very pleased with the results from using statistical quality control," he notes.

Kneister says that part of their success in breaking into the Japanese market was consistency and commitment. "Because we are a small company we used a Japanese agent," he explains. "And you have to call on your customers for a long period of time before you get an order. Then you go through a courtship to see if you can meet their quality requirements—they're very fussy about quality—and their delivery schedules. After this period, which can take two to three years, you become an accepted supplier."

This acceptance process by foreign businesses is something that even the largest American suppliers are just beginning to learn. When GM's AC Spark Plug Div. first tried to crack the Japanese market, it did so with sales engineering people who came right out of Detroit and didn't speak a word of Japanese. Now AC's Manager of International Vehicle Applications for the Asia-Pacific region, Philip Austin, speaks fluent Japanese and is based in a Tokyo office.



Detroit's Trade Deficit Grows In Future

Foreign Trade Flows of Auto Parts

Source: Arthur Andersen

"Being able to speak the language really adds to your credibility," admits Leonard Swoyer, AC's general sales manager. "We had to be as good as anyone else; that's the law of the jungle."

Even so, says Swoyer, selling in Japan requires more than just good quality or price. "You have to bring something to the party that they can't lay their hands on," he says, especially emission and electronic engine controls.

Others agree that proprietary technology is a requirement for exporting to foreign markets, but high volume production can also result in economies of scale which other countries can't match.

"It's conceivable that certain automatic transmissions or even larger displacement engines could be built in volumes well over a million units in the US," suggests Martin Anderson. "This means we can get tremendous economies of scale that can compensate for higher labor costs."

Apparently Buick's general manager, Lloyd Reuss sees it that way, too. "We want to become the world's largest supplier of torque converters," he says, and notes that Buick is in the process of becoming a major supplier of transmission gears. Even more, Buick is designing all its automotive products to be sold overseas.

And within the industry proper, the Automotive Industries Action Group, a group representing the domestic OEMs and many of their suppliers, is working to simplify parts ordering and processing to reduce costs and inventory levels and to improve quality (see Mar. '83, "Middle Management Takes Charge," p. 31)

Finally, the US government is stepping in to help American companies compete overseas.

"The Commerce Department is charged with implementing the Export Trading Act of 1982," explains Michael Driggs, deputy assistant secretary for automotive affairs at the Commerce Dept. "Basically it allows the Department to approve an application which will allow a number of companies to get together under an anti-trust umbrella and ease some of the regulations on banks to provide financing to make it easier for US companies to export their goods."

Although it may be a slow and painful process, most analysts and industry observers see better times ahead for US automotive suppliers. ■

Buying Abroad

Japanese automakers' plans to purchase parts and components from outsource suppliers

Automaker	1982 Purchases	% Increase Over '81	1983 Purchases*	% Increase Over '82
Toyota	$110,188,000	+18.2%	$131,378,000	+19.2%
Nissan	224,614,000	+12.1%	NA	NA
Toyo Kogyo (Mazda)	46,618,000	−15.4%	55,094,000	+18.2%
Honda	80,479,620	−17.9%	88,998,000	+10.6%
Mitsubishi	22,079,980	− 4.8%	20,978,100	− 5.0%
Isuzu	37,167,260	− 6.1%	43,333,550	+16.6%
Fuji (Subaru)	20,342,400	+45.5%	22,037,600	+ 8.3%

$1.00 = 236 yen
*Planned

Under growing worldwide protectionist pressures, Japanese automakers are striving to purchase more parts and components off-shore. This presents new opportunities for US suppliers.

Single copies of this article are free. Circle 503 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

US FORECAST

'QUALIFIED' OPTIMISM FOR NEW VEHICLE SALES

AI's sampling of forecasted sales and production figures by major research organizations and Detroit's Big Three reveals universal but guarded optimism. The results predict passenger car sales will inch toward 9 million this year, and light trucks sales will top the 2.5 million mark.

by Michael K. McCann

The stock market continues to boom, the unemployment rate levels off and some automobile production plants are rehiring workers. Confident that the recovery has begun, you'd think all the resident automotive analysts would be falling over one another to predict the level of recovery for the auto industry.

The head honchos in Detroit act like they're walking on eggs when it comes to predicting '83 sales. The same thing can be said about the research organizations that specialize in automotive analysis. One major research firm, in responding to *AI*'s request for marketing information, would provide data only if the company was not identified.

"We've been burned too many times," says a Ford spokesman. "It's been that way not only with us, but also for the forecasting firms. There's been an awful lot of qualifying lately."

Ford's president Donald Petersen qualified his latest '83 estimate by saying that it would top 1982's level by at least 10%. He explained that there's a good chance that the final totals will top 9 million.

Most analysts do agree that years such as 1978, when passenger car sales reached 11.3 million and truck sales hit 4 million, may be gone for good. We could still see such volumes if everything falls in place—low interest rates, an upturn of consumer discretionary income and reasonable new car prices.

George Hanley, director of short term forecasting at GM Economics Staff in New York City, estimates passenger car sales will be in the low 9 million unit range for '83. He claims light trucks will run a bit less than 3 million units this year.

Most Analysts Cautious On '83, See Upturn In '84 (in millions)

	Merrill Lynch	Chase Econometrics	Research Bernstein	Data Resources Inc.	Automotive Info. Council	Predicasts Inc.	Prescott Ball & Turbin	Motter	Adduci
PASSENGER CARS									
1983 US Production	6.4	6.63	6.5	—	7.0	5.95	6.6	—	6.75
1983 Sales, US & Imports	8.9	8.87	9.1	8.9	9.0	8.45	8.8	8.4	9.0
1984 US Production	7.6	7.63	7.5	—	—	6.45	6.7	—	—
1984 Sales, US & Imports	10.5	10.62	10.1	10.3	—	9.375	9.55	—	—
LIGHT TRUCKS									
1983 US Production	2.0	1.96	2.1	—	2.1	—	2.25	—	2.05
1983 Sales, US & Imports	2.6	2.6	2.65	2.6	2.4	—	2.65	2.5+	2.5
1984 US Production	2.4	2.41	2.3	—	—	—	2.4	—	—
1984 Sales, US & Imports	3.0	3.0	3.1	3.2	—	—	2.75	2.75	—

Source: AI Marketdata

The US Auto Market: 1974-82

Year	New-car sales, millions	Import car share, percent	Age of stock, years	Average price, dollars	CPI average price, dollars	Average finance rate, percent	Loan maturity, months
1974	8.9	15.9	5.7	4,390	4,390	12.6	35.7
1975	8.6	18.3	6.0	4,750	4,768	13.1	37.6
1976	10.1	14.8	6.2	5,470	5,068	13.2	38.8
1977	11.2	18.6	6.2	6,120	5,336	13.2	40.7
1978	11.3	17.7	6.3	6,470	5,742	13.2	43.0
1979	10.6	21.9	6.4	6.950	6,196	13.5	44.3
1980	9.0	26.7	6.6	7,340	6,691	14.8	44.7
1981	8.5	27.3	6.9	8,850	7,100	15.9	45.2
1982	8.0	27.9	7.2	9,750	7,369	15.8	46.0

Source: Federal Reserve, Cleveland

Hanley admits the recovery has started, but "whether or not it's sustainable is another question." He cites some favorable signs. "The last round of tax cuts are coming in July. Interest rates continue to fall, especially in the consumer loan category, and there appears to be a trend towards new car price moderation."

Now the question is keeping the upbeat going. "Can we get the last pieces of the puzzle in place?" Hanley emphasizes. "Something must be done about the budget. If we don't there will be additional upward pressure put on interest rates. This could reignite inflation. The balance between monetary and fiscal policy could be the major cause of an abortive recovery."

Chrysler's chairman Lee Iacocca believes the main poison in today's economy is high interest rates. He claims the auto industry won't sustain a healthy surge until interest rates dip below 12%.

But if interest rates do decline, Chrysler expects to take a big bite out of the market. "The company expects that domestic sales will improve to about 7 million if interest rates continue to fall," says a Chrysler spokesman. "We expect total US and import sales to hit 8.8 million. We also expect to take at least 10% of that market which would give us 880,000 units. About 750,000 of that would be domestic and 100,00 would be import.

"We're looking at a light truck market of 2.7 million. Here, we'll take 10% which means 270,00 units. But again, you've got to remember that the whole thing is triggered by lower interest rates. If that doesn't happen it could throw the whole thing out of whack."

Karl Motter, chairman of the forecasting committee of the Automotive Market Research Council (AMRC), explains that total passenger car sales should run about 8.4 million. (This is Motter's opinion and should not be regarded as the view of the entire council membership. The AMRC is composed of over 300 members from 90 automotive-related firms which are primarily engaged in market research and marketing management.)

Motter predicts total light truck sales will run well over 2.5 million units for '83 US and imports. For '84 Motter expects 2.75 million light trucks to be sold—both US and import.

V. J. Adduci, president and CEO of the Motor Vehicle Manufacturers Assoc., says the latest forecast he'll quote is one that suggests that passenger car retail sales in '83 should hit 9 million. Domestic offerings will account for 6.75 million and imports 2.25 million in this forecast. Light truck retail sales are forecast at about 2.5 million, split 2.05 million domestic and .45 million import.

Adduci won't summarize any of the published forecasts, "since both passenger car and light truck forecasts change, literally, from month to month. Likewise, forecasts for '84 are just too speculative at this point, hinging as they must on assumptions about the breadth and depth of the beginning recovery of the US economy."

Michael F. Bryan, an economic analyst with the Federal Reserve Bank of Cleveland, predicts '83 car sales will hit 9.3 million. Bryan used an average derived from 43 separate forecasts that can be found in the "Blue Chip Economic Indicators" newsletter published by Eggert Econometric Enterprises, Sedona, AZ.

Bryan is also in the midst of preparing a model which will help the Fed develop new car sales forecasts in the future. He says it's an equation which factors in income, gasoline and new car prices, interest rates and the number of eligible buyers among other things.

"We have found that the most significant factor affecting new car sales is real personal income," says Bryan. "And most economists will tell you that '83 will be a pretty good year for income growth, particularly toward the end of the year. As a result, we believe that the auto market ought to really spurt toward the end of the summer months."

Bryan claims the second most important variable is gasoline cost. "It not only influences how many new cars are sold, but whether people buy new cars versus used cars and what size of car they purchase."

Other evidence suggests to Bryan that interest rates and new car prices aren't as important as most analysts believe. "Our very early equations couldn't come up with a price variable that was very significant at all," he states. "And in my last equation we've changed the definition of price around to include factors such as interest rates and depreciation."

According to Bryan, the sticker shock synopsis has been overstated. "The relative price of new cars has been falling over a long period of time, particularly since 1978. In fact, the prices of new domestic cars have risen less than the rate of inflation as measured by the consumer price index (CPI) during the last year and a half."

Another factor which should help sales is a higher auto scrap rate. "This should help out considerably," notes Bryan. "Over the next few years such replacement could add as many as 1 million units annually to new car sales."

But Bryan emphasizes that the strength of any forecast resides precariously in the ability of labor markets to improve real consumer incomes during the year. "If that's the fact," says Bryan, "it would appear that auto dealers should enjoy the second half of the '83 sales year, with even stronger sales to follow." ■

Single copies of this article are free. Circle 504 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

Bryan	Ford	GM Economic Staff	Chrysler	AVERAGE
—	—	—	7.0	6.60
9.3	9.0+	9.0+	8.8	8.89
—	—	—	—	7.18
—	—	—	—	10.07
—	—	—	—	2.08
—	—	3.0−	2.7	2.62
—	—	—	—	2.37
—	—	—	—	2.97

THE LONG HAUL BACK TO PROSPERITY

Four years after cresting the biggest sales peak in its history, the truck and equipment industry is geared down and pulling hard to leave the bad times of 1982 behind.

by Lance A. Ealey

In 1979, the US heavy truck industry charted its best factory sales year ever, with 182,139 Class 8 diesel trucks sold. In 1982, total US Class 8 factory sales had plunged to 75,258, their lowest level since 1968. Doing more with less has almost become a territorial imperative within this increasingly competitive industry.

The breakeven point at Ford Heavy Truck has been slashed radically in the last few years. The division made a small profit in 1982 on 42,000 unit sales, while in less dietetic years it reported losses on sales that hit 100,000 units. "We're very much more careful about product proliferation," says Edward Mabley, Ford Heavy Truck development manager. "We're not necessarily going to add every new product that comes along."

Other manufacturers, such as Mack Trucks, Inc., have been equally cost conscious. "I think we saw this [recession] coming quite early as compared to other people," says John Curcio, Mack's president. "We've reduced our breakeven since 1980 by 50%."

Among the suppliers, Eaton's downsizing program is probably the most dramatic. Industry sources say Eaton Corp.'s breakeven revenue level has been reduced by $500 million. The company has cut employment by 36% over the past 3 years. On the heavy-duty side, Eaton has idled axle plants in Cleveland, OH and Louisville, KY and its transmission plant in Kalamazoo, MI.

"We see the market becoming much more competitive for our truck-oriented automotive components," says Lee Loseke, Eaton VP for North American Operations, Heavy Truck Components. "Certainly, a slim organization can move faster and has a better cost base. People are becoming extremely cost and price conscious because of the deregulation effects on the industry. And *that's* reverberating all the way through the supplier chain."

Most Dana Corp. plants have also been operating at 50% capacity or below, according to William Prebe, VP-economist for Dana. "The most amazing aspect is that we have operated at such a low level of utilization and made money," Prebe says.

What lies ahead for the truck industry and its suppliers?

"So far, no one I've talked to, including the OEMs, people who usually see things earlier than we do, has seen any indication of an upturn," says Mack's Curcio. "There was some indication that some of the pent-up demand might break loose until the states and the federal government started squabbling about the Surface Transportation Act. Now people are hesitating again, because if they put on new equipment to be productive under the new provisions, there are certain states that are going to pull them over and arrest them. They need the trucks but don't want to buy the old type of equipment. It's just another reason to defer buying."

"The heavy industry is still flat," says Thomas Dougherty, marketing VP at International Harvester. "In fact, the last couple of months would indicate a slight further downturn, though we are not changing our industry projections for the year. Medium-duty is suffering. It has had a slight downturn that we do not believe will turn around in time to meet [our] prior industry projection, so we've lowered our projection to 116,000 units."

"Our fiscal year '83 forecast calls for a lower level of sales activity than the industry experienced in 1982—roughly 81,500 North American factory shipments of Class 8 vehicles," says Rockwell's James Lambert, North American Field Sales/ Marketing VP, Heavy Vehicle Component Operations. Lambert also indicates Class 5-6-7 North American shipments should be about 104,500 units this year, also a decrease from 1982. "If we are to reach even these levels, the industry must now show a moderate improvement from the very weak first quarter rate," Lambert relates.

Mack's Curcio agrees. "In first quarter '83, [Class 8] factory sales are already 21%

US Factory Sales Of Class 3 Diesel Trucks

Year	Total Sales	Domestic Sales
1982	75,258	67,453
1981	110,742	93,769
1980	116,860	98,002
1979	182,139	157,762
1978	167,300	149,498
1977	149,839	135,361
1976	108,263	91,620
1975	84,878	59,936
1974	150,429	131,624
1973	145,983	133.496
1972	124,481	114,290
1971	96,295	88,485
1970	85,288	77,965
1968	69,405	64,815

Source: MVMA

behind 1982. So, if we're just to equal 70,000 units in '82, we have to have some upturn in the last half of the year. My official position at the moment, that we're using for all our planning purposes, is that the Class 8 market this year will only be 65,000."

Dana's Prebe says, "I think it's going to be a very sluggish pickup. I don't look for any strength really to surface until probably the fourth quarter."

"In Class 8s, retail sales for the quarter came in at 18,000," says Harry Allen, industry analyst for Merrill Lynch. "That's down from 20,000 a year ago. The second quarter I'm estimating will be up from the first but still a touch below last year—I'd say between 19,500 and 20,000. It was 20,285 last year. I think that by May or June the order board should start to pick up and the third quarter would see an actual year-to-year increase in sales because it was so miserable last year."

Allen doesn't expect retail sales for the year as a whole to do very well, although he does expect them to come in a few percent above last year. "I think production will be up more because we had a fairly drastic reduction in inventories last year. If business does pick up, I can see a production gain of, say, 15% on a sales gain of 3% to 5%."

Looking further ahead, Allen says he's estimating '84 production could be 45% better than this year's based on the theory that, as shipping increases with the recovery, truckers will find refurbishing old, mothballed vehicles less attactive than buying new trucks which might be as much as 30% more efficient.

Another reason Allen points to an upturn is the increasing age of the heavy truck population, and the current reduced levels of new truck sales. In the first years following 1979, Allen says there was a fairly healthy market in one and two year old trucks. Currently, the industry is producing far fewer Class 8 diesels. "If you want to buy a good, relatively new, used truck, you're going to have many fewer to choose from," he says, "which says to me they're going to be scarcer and prices are going to go up because of the scarcity. There will be less incentive to go used than new, and there'll also be, if prices go up a little on used trucks, a little more incentive to trade."

Most of the manufacturers and suppliers queried feel they're well-positioned to take advantage of any rebound in the works.

"We did lower our breakeven point," says Dana's Prebe, "but that doesn't suggest we have gotten rid of any capacity. It just means we're getting better productivity with what we have on stream. When the rebound comes, we'll be fully prepared to participate."

"We're in very good shape," says George Malley, president of Fruehauf Div. and executive VP of Fruehauf Corp. "We're going to have some build-up problems, which we always have in our business, but our concern is a little further down the road. If we do get a fairly sustained recovery down the road, we are concerned about the capacity situation with some of our suppliers. Once they get going, I don't see any problems, but in the middle range, when we get up to some of higher numbers that are being kicked around, there might be some problems with some major components, wood particularly."

International Harvester's Dougherty says the company's concern "is that all of our suppliers have also reduced their schedules pretty dramatically, and the suppliers' suppliers have reduced their schedules, all the way back to the steel mills and even the coal mines. It would take at least six months for all of the support industries to get their schedules up to support the final assembly schedules of manufacturers."

Dougherty expresses an interesting sidenote. A person buying an International truck today "will never get better quality because the people assembling our trucks today have 20 years of experience and they know how to put trucks together. But that would change very rapidly if the order board changed rapidly [and IH began hiring relatively inexperienced people]."

As for hopes for a return to those euphoric sales days of 1979, Mack's Curcio says, "We all know the truck industry has become more efficient. There are going to be less trucks utilized, and there have been in-roads by the railroads, especially in the area of piggybacks. We just don't see a return to that level of market. If you took the next 5 years and averaged them out, we'd probably average in the area of 120,000."

"We're pretty firmly convinced there have been some fundamental changes in the marketplace," says Eaton's Loseke. "I just don't see that kind of demand for trucks, at least within the foreseeable future."

"Those were high water marks and I think it's going to be a long, long time before we ever reach them again," says Dana's Prebe.

"Not in the next 10 years," adds IH's Dougherty. ■

—Reported by John M. Baxter, Joseph M. Callahan and Lance A. Ealey

---

Single copies of this article are free. Circle 506 on the Information Card. For reprint information contact AUTOMOTIVE INDUSTRIES, Marketing Dept., Radnor, PA 19089

MISCELLANEOUS

For more information check profile section and advertisers' index.

Mac Tools Inc
P. O. Box 370
Washington Ct House, OH
43160
F J Kibbey VP Sls
614-335-4112
Z-10, Z-11

Maday Body & Equipment Corp
575 Howard St
Buffalo, NY 14206
Jim Wolf Gen Sls Mgr
716-853-8628
Z-10, Z-11

Manufacturing System Div
of Bendix/Comau Production Systems
32515 Industrial Dr
Madison Heights, MI 48071
Robert Lindner Gen Mgr
313-583-4130
Z-11

Markel Corp
Box 752
Norristown, PA 19404
Robin C Markel Adv Mgr
215-272-8960
Z-10

Meyer Products Inc
18513 Euclid Ave
Cleveland, OH 44112
W R Forbes Dir Mktg
216-486-1313
Z-10

Mod Designs
Graphic Chemical Fab
10081 Johnstown-Utica Rd
Johnstown, OH 43031
William T Grove Pres
614-967-7484
Z-11

Moeller Mfg Co Inc
P. O. Box 1318
Greenville, MS 38701
W F Fisher VP
601-335-2325
Z-10

Monon Trailer
P. O. Box 655
Monon, IN 47959
Bill Hoover VP Sls
219-253-6621
Z-10

Neese Coated Fabrics Inc
1541 Hadley St
St Louis, MO 63106
Donald Roth
314-421-0270
Z-10

NLB Corp
29830 Beck Rd
Wixom, MI 48096
Chuck Allen Mktg Mgr
313-624-5555
Z-10

Nordson Corp
Packaging & Assembly Div
350 Research Ct
Norcross, GA 30092
Peter Farrier
404-449-7570
Z-10

★ **Nordson Corp**
350 Research Ct Technology Pk
Norcross, GA 30092
John Cove Adv Mgr
404-449-7570
Z-10

Norton Co
1 New Bond Street
Worcester, MA 01606
H V Rudin
617-853-1000
Z-10

Owens Classic Inc
Box 628
Sturgis, MI 49091
Bradley Baker Sls Mgr Trailers
616-651-9319
Z-10

Patented Products Corp
Box A/AI
Danville, OH 43014
Bob Crise Sls Mgr
614-599-6842
Z-10

Phillips Mfg Co
1215 W Washington Blvd
Montebello, CA 90640
John Rayburn Mktg Mgr
213-726-2222
Z-10, Z-11

Power Test Inc
PO Box 87 502 Salisbury St
Newburg, WI 53060
John Petelinsek Pres
414-675-6748
Z-10

Premier/CENTRAL Truck Body
2770 Bluff Rd
Indianapolis, IN 46225
Rob Matthews Mgr Dist Sls
317-788-0821
Z-10

Pyles Div
Kent-Moore Corp
28990 Wixom Rd
Wixom, MI 48096
Paul Shafer Sls Promo Mgr
313-349-5500
Z-10

Quickway Inc
Box 1086
Muskegon, MI 49443
David W Quail VP
616-739-8950
Z-10, Z-11

Rhino Sales Corp
620 Andrews Ave
Kewanee, IL 61443
Bob Martin VP Mktg
309-853-4461
Z-10

Rohco Inc
McGean Rohco Div
3203 W 71st St
Cleveland, OH 44102
Wm E Satala Mktg Mgr
216-651-7300
Z-10, Z-11

Schien Body & Equipment Company
Box 229
Carlinville, IL 62626
John Schien Pres
217-854-9621
Z-10, Z-11

★ **Sheller Globe Corporation**
1505 Jefferson Ave PO Box 962
Toledo, OH 43697
W R Roush Mgr Adv Sls Promo
419-255-8840
Z-10

The Stackpole Corp
201 Stackpole St
St Marys, PA 15857
814-781-1234
Z-10

Stahl-A Scott Fetzer Co
The Scott & Fetzer Co
3201 W Lincoln Way
Wooster, OH 44691
Steve Davis VP Mktg
216-264-7441
Z-10

J O Stephenson
Probon Inc
21272 E River Rd
Grosse Ile, MI 48138
J O Stephenson Chairman
313-676-7020
Z-10, Z-11

Storch Products Co Inc
11827 Globe Rd Box 2346
Livonia, MI 48151
M Papora VP
313-591-2200
Z-10

SuperFlow Corp
3512 N Tejon
Colorado Springs, CO 80907
Harold Bettes Sls Mktg
303-471-1746
Z-10

Suspa Inc
3970 Roger B Chaffee Dr
Grand Rapids, MI 49508
Michael Dunlap Dir Mktg
616-531-9600
Z-10

Tempo Products Co
6200 Cochran Rd
Cleveland, OH 44139
John Krizansky Auto Sls Mgr
216-248-1450
Z-10

Termiflex Corp
18 Airport Rd
Nashua, NH 03063
Vernon C Maine Sls Mgr
603-889-3883
Z-10

Union Carbide Corp
Old Ridgebury Rd
Danbury, CT 06817
Madeline Francis
203-794-3600
Z-10, Z-11

Union City Body Co
Drawer 190
Union City, IN 47390
Tim K Puderbaugh Gen Sls Adm
800-428-6650
Z-10

Uniroyal Inc World Headquarters
P. O. Box 1126 Wall St Station
Middlebury, CT 06749
203-573-3717
Z-10

Utility Trailer Mfg Co
Aftermarket Div
Box 1299
City Of Industry, CA 91749
W J Gray Dir
213-965-1541
Z-10, Z-11

Viskafors Gummifabrik AB
Box 2059
S-51502 Viskafors,
Stig Thureson Div Mgr
0339700
Z-10

Warren Fastener Div
Emhart Corp
49201 Gratiot Box 868
Mt Clemens, MI 48043
R M Wulbrecht Dir Sls & Mktg
313-949-0440
Z-10

Wolverine Aluminum Corp
1650 Howard St
Lincoln Park, MI 48146
Jack Cassedy VP Mktg
313-386-0800
Z-11

3M
Industrial Electrical Prod Div
Building 225-4S 3M Center
St Paul, MN 55144
Diane Wain Mkt Comm Coor
612-736-2188
Z-10, Z-11

3M Co
Industrial Specialties Div-Detroit Branch
23923 Research Dr
Farmington Hills, MI 48024
Jerry Olson Sls Mgr
313-477-5000
Z-10

★ **3M Industrial Tape Div**
3M Center Bldg 220-8E-01
St Paul, MN 55144
W E Woods Natl Sls Mgr
612-733-1441
Z-10, Z-11

MISCELLANEOUS

Z-10	Miscellaneous Products
Z-11	Miscellaneous Services

INTERNATIONAL STATISTICS

European Diesel Content

Western European Sales: diesel content by manufacturer and overall market share, passenger cars, 1981 and 1982, percentages

	1981	1982 first half	
	Diesel content	Diesel content	Overall market share
Renault	7.9	8.3	14.4
Fiat	11.3	14.6	13.0
PSA[1]	11.0	10.3	12.7
VAG[2]	26.5	27.7	12.3
Ford	0.5	0.6	11.9
General Motors[3]	0.1	4.9	9.9
BL	0.2	0.2	3.4
Mercedes-Benz	44.6	46.2	3.1
BMW	—	—	2.9
Japanese	2.6	3.1	8.5

[1] Peugeot + Citroen + Talbot
[2] Volkswagen + Audi
[3] Opel + Vauxhall

Source: Autotrend

European Diesel Market Share

Western European Sales: diesel market shares by country, passenger cars, 1978-82, percentages

	1978	1979	1980	1981	1982 first half
Group A					
France	6.5	7.3	9.9	11.7	10.4
F.R. Germany	5.9	7.2	7.7	13.8	14.4
Italy	4.5	4.1	8.1	14.4	17.0
United Kingdom	0.2	0.3	0.4	0.7	0.8
Group B					
Belgium	7.4	11.0	13.1	16.8	17.4
Netherlands	4.0	6.9	6.8	9.3	8.3
Spain	1.4	4.1	5.7	7.9	9.5
Group C					
Austria	4.9	5.0	3.1	3.6	4.5
Denmark	2.2	3.2	3.1	3.2	3.4
Finland	5.8	7.8	8.6	9.1	8.0
Ireland	1.5	1.8	2.4	3.8	4.2
Norway	2.3	3.5	4.7	7.0	5.0
Portugal	15.0	12.8	10.8	10.0	6.4
Sweden	4.1	6.5	7.2	6.7	5.6
Switzerland	0.4	0.6	0.8	1.1	1.1
Western Europe	4.4	5.3	6.8	10.1	10.5

Source: Autotrend

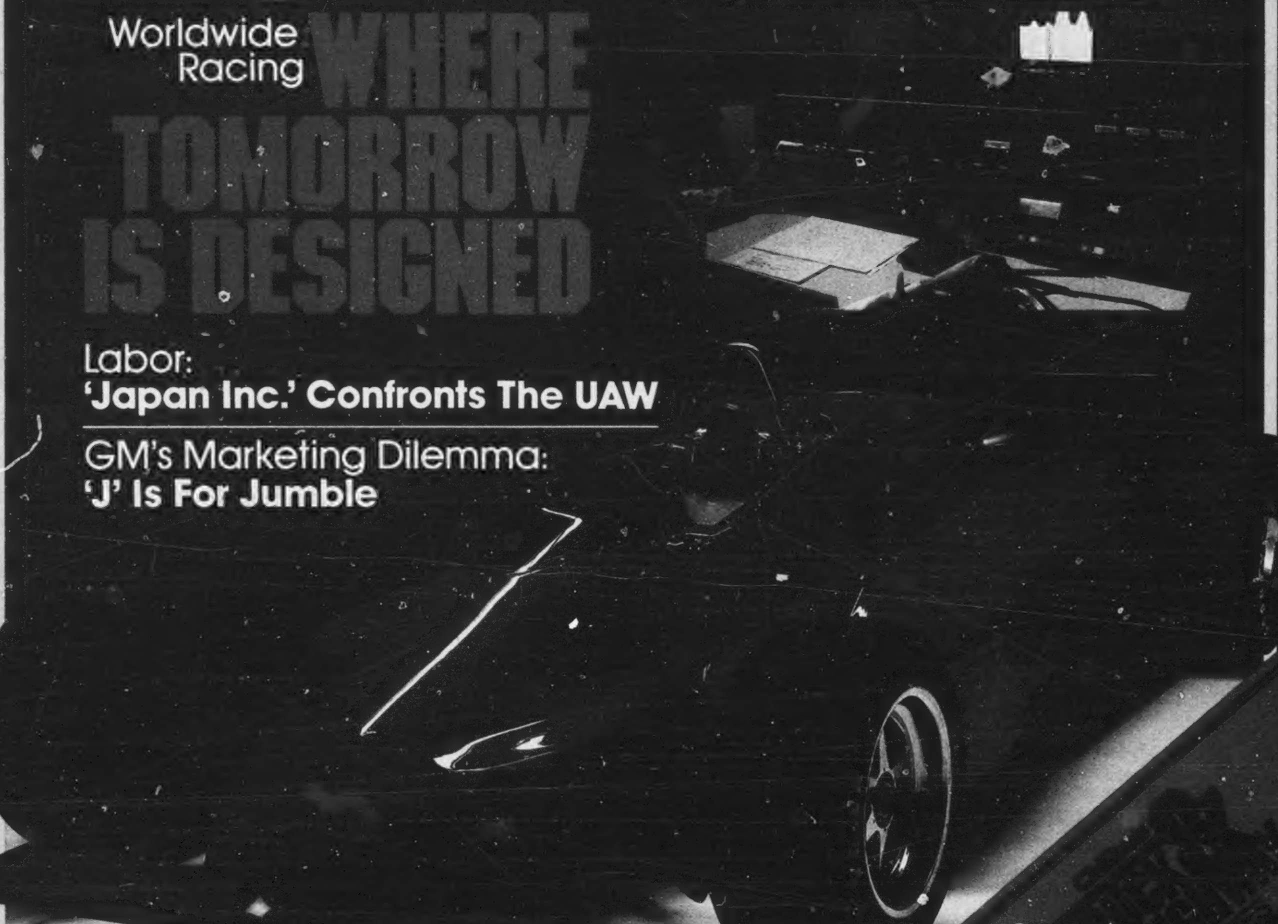
CHILTON'S 7/1983

AUTOMOTIVE INDUSTRIES

WITH TRUCK & OFF-HIGHWAY INDUSTRIES

C2150-3A 7/18/83

MARTINI RACING
14



Worldwide Racing WHERE TOMORROW IS DESIGNED

Labor:
'Japan Inc.' Confronts The UAW

GM's Marketing Dilemma:
'J' Is For Jumble

Included In This Issue [illegible]

AUTOMOTIVE INDUSTRIES

July, 1983/Volume 163, Number 7

FEATURES

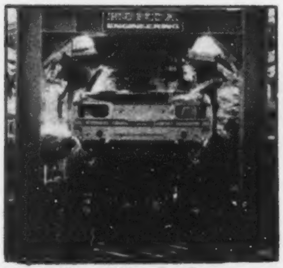
18 Honda Marysville: Japanese Methods In Ohio
Honda has finally opened its closely-guarded Marysville assembly plant. Inside, *AI* finds the Japanese and their systems hard at work.

21 Japan Inc. Confronts The UAW
The confrontation between the UAW and the GM/Toyota joint venture involves a whole series of face-offs concerning the way in which the UAW and Japan Inc. believe an automobile plant should be operated.

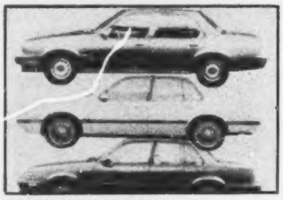
24 GM's Marketing Dilemma: J Is For Jumble
GM's auto letter designation system may have taken a sizeable slice out of the company's buy-American pie. Now GM's in the process of changing its body-platform nomenclature, but the damage to its divisional identities may be beyond repair.

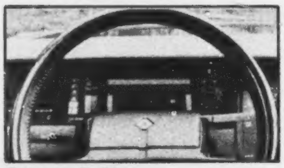
28 After The Alliance . . . Renault Plays An Encore
Having taken the US economy car class by storm with an R-9-based notchback, Renault plans a repeat performance with an Americanized R-11 hatchback with dazzling visuals and audible electronics.

16-17 Special Racing Supplement


Honda Marysville—P. 18

Japan/UAW—P. 21


GM Marketing—P. 24


Encore—P. 28

Racing—P. R-1

NEWS & DEPARTMENTS

5 Editorial: AI Strengthens Its Story
6 Letters: General Motoyota—A Cause For Hope
11 Newsline
13 Marketdata
14 Detroit: Surviving In The 'New Ballgame'
30 Advertisers' Index
32 Business Managers
33 Reader Information Cards

COVER

A. J. Foyt's March Indy car, Cosworth engine research and development, and Lotus materials innovation form an engineering test bed that helps to improve the breed of production cars.

NEXT MONTH

AI goes inside the robot industry for a look-see into this ever-changing arena of high technology. A robot showcase is also included.

QUOTABLE

Former Grand Prix world champion Alan Jones on byte-ing tires and floppy disc brakes—"Designers are becoming less reliant on drivers and more on computers. A team manager can now set up a complete computer simulation program for a particular circuit and feed in variables to test the effect of different tires, suspension setting and so on."

AUTOMOTIVE INDUSTRIES (ISSN 0273-656x) magazine is published monthly by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription prices: United States and US Possessions—$30.00 per year, $55.00 for 2 years; Canada and Foreign—$75.00 per year. Air rates on request. Single copies and back issues on request. All subscription orders must be accompanied by cash or check, along with complete information for classification, including the title of the individual and the product the company manufactures. Second Class Postage Paid at Wayne, PA 19087 and additional mailing offices. POSTMASTER: Send address changes to AUTOMOTIVE INDUSTRIES, P.O. Box 2055, Radnor, PA 19089. ©Chilton Company, 1983. Permission to photocopy for internal use or the internal use of specific clients is granted by Chilton Company for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $1.00 per copy of the article, plus 25¢ per page is paid directly to the CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to The Editor. (0273-656x/83 $1.00 + 25¢)

Ford's Ranger Gets Twin Clutch Automatic

A little snooping by *AI's* intrepid covert action squad at the Sitev Show in Geneva indicates the British firm Automotive Products has plucked a plum for its patented twin clutch automatic gearbox unveiled several years ago. Initial reports say the unit will be an option on the 1984 Ford Ranger in the US, and Ford Europe may fit it to the Fiesta. AP has also received development contracts from two major French manufacturers, widely suspected to be Renault and Peugeot, which are considering the transmission for their R9 (US Alliance) and 305 models, respectively.

Basically, the tranny is a split gearbox with each half having its own clutch. Either one of the clutches is engaged at any one time, allowing worry-free loud pedal shifts. No torque converter is used so power loss is minimal. The system operates at or near the efficiency of a manual, and weight and cost are somewhere between a manual and conventional automatic.

With CVTs currently enjoying "innovation of choice" status for small cars of the near future, OEs not on the CVT bandwagon are looking for alternatives such as the AP unit to lessen the CVT's expected marketing impact. AP has been seeking to license the design to manufacturers and hopes to supply the clutches for the unit. One of the big advantages of the system is that it can be made on an only slightly modified manual gearbox transfer line, so it is attractive as an in-house proposition.

Goodbye Orange Peel

The 3M Co. of St. Paul, MN is researching a process for painting cars that would employ very thin, colored and pre-formed film that would be attached with an adhesive to the sheetmetal panels after the car was built. The process would eliminate the entire paint operations and their troublesome paint emissions and probably cut painting costs.

New Wave Noise Control

A group at the University of Essex in Colchester, England, has been investigating a radical new method for eliminating noise. The method involves producing the exact waveform of the original noise and then generating an antiphase version of equal amplitude. The two waveforms when added together produce . . . silence. The Essex researchers observe that many noises are periodic or recurring—the clatter from piston engines, for example—so the noise from one cycle can be recorded to predict the next one. The Essex team developed an adaptive waveform generator to produce the anti-noise signal.

One of the most interesting features of the Essex system is that it is selective. The more accurately it can be synchronized the greater the selectivity. In practice this would mean that, with an anti-noise generator, a truck driver cruising at full tilt could carry on a pleasant, unscreamed conversation with his passenger.

Terminal Health Care Costs

Chrysler recently appointed Joseph Califano, ex-Secretary of Health, Education and Welfare, to its board of directors. In light of the company's bleed-white health costs, it's no wonder. This year Chrysler will pay $373 million in health insurance premiums—more than $6000 per active worker. Including Medicare taxes and the health insurance costs from Chrysler's suppliers, it comes to $600 per car and truck made in the US. That's 10% of the price of an Omni/Horizon. In 1970, the cost was $75 per vehicle.

Motoroiler

Motorola expects auto electronics sales to triple in Europe in the next four years and has ambitions concerning at least a quarter of those sales. To that end the company has developed a rolling showcase, called the Motocar, which features no less than 23 microprocessors to control ignition, fuel, cruising, A/C, trip control, etc. The computer-quasi Moto even has an electronic key that can wind down the windows and unlock the doors remotely. Instrumentation is vacuum fluorescent lighted and there is a single socket for fault diagnosis. A touch of a switch can recall any of four preprogrammed driver's seat and mirror positions on demand. The Motocar replaces 1640 ft (500 m) of wiring by 246 ft (75 m) of multiplexed wire and fiber optics, thus reducing weight, improving reliability and making use of electronics virtually limitless.

AI MARKETDATA

Class 8 Upshift?

Jack Klock, chairman of Klock Advertising, says Class 8 truck factory sales will hit 82,354 in 1983, an increase of 8.3% over last year. Doubters take note—by his own admission, Mr. Klock has racked up a pretty impressive forecast record since the beginning of the decade. In 1980 and 1981, Klock was +1.37% and +0.21% off the actual Class 8 factory sales for those respective years. In 1982, he was −0.41%. Klock states, "This economic forecast is probably within ±5%."

Auto-Globe Forecast

A recent DRI Europe forecast indicates that with the exception of North America, the short-term outlook provides little support for a world-wide auto recovery this year. DRI says many manufacturers will find it impossible to earn adequate returns on recent heavy product spending. Problem children are France and Italy—the former because of the French government's new austerity budget, the latter because of increased taxation. 1984-85 look a lot brighter, however, and DRI's predicting a strong recovery for the industry during these two years. The forecast says by 1988 the European total market will reach a new sales peak of 11 million cars.

New Car Sales/Production (millions)

	1983		1984		1988	
	sales	prod.	sales	prod.	sales	prod.
Total W. Europe	10.00	10.41	10.30	10.78	11.09	11.50
US	9.01	—	10.34	—	11.36	—
North American	—	7.17	—	8.13	—	8.93
Japan	3.13	7.08	3.20	7.58	3.28	8.05

Source: DRI World Automotive Forecast

Four-Banging Fleets

Cheap gas wilts the best laid plans of mice and auto makers as the econoconsumer pulls a 180° away from the frugal four-banger to embrace America's old flamer, the big cube V8. Fleet execs aren't buying it, according to *Runzheimer Reports on Transportation*. 24% of today's average fleet is filled by four-cylinder cars, up from 10% a year ago. Eights make up 31%, down from 35% last year. The rest are sixes. Runzheimer says fleet executives project a 27% four-cylinder content by 1984, with eights falling to an equal percentage. Another trend in opposition to consumer-think among the fleets regards basing car-buying decisions on lower fuel prices. 92% say cheap gas won't influence fleet composition.

Where Credit's Due

The value of GMAC and Ford Motor Credit Co. in terms of parent-subsidiary cash flow transfusions should be significant through 1988, according to two Bernstein Research reports. "Net cash to GM could exceed $3.0 billion for the 1983-88 period versus nearly $500 million in net *outlays* (from GM) to GMAC between 1978 and 1982," says Bernstein. As for Ford Credit, "net cash to Ford could exceed $1.2 billion over the 1983-88 period, versus just $125 million for 1978-82," the report states.

Truck Trailer Demand

Alcoa is predicting truck trailer demand will hit 107,000 units this year. W. Boone Groves Jr., Alcoa Commercial Automotive's market manager, says shipments of 130,700 are expected in 1984, 165,000 in 1985 and 170,000 in 1986. 1987 shipments are expected to dip to 142,000.

Market Minutiae

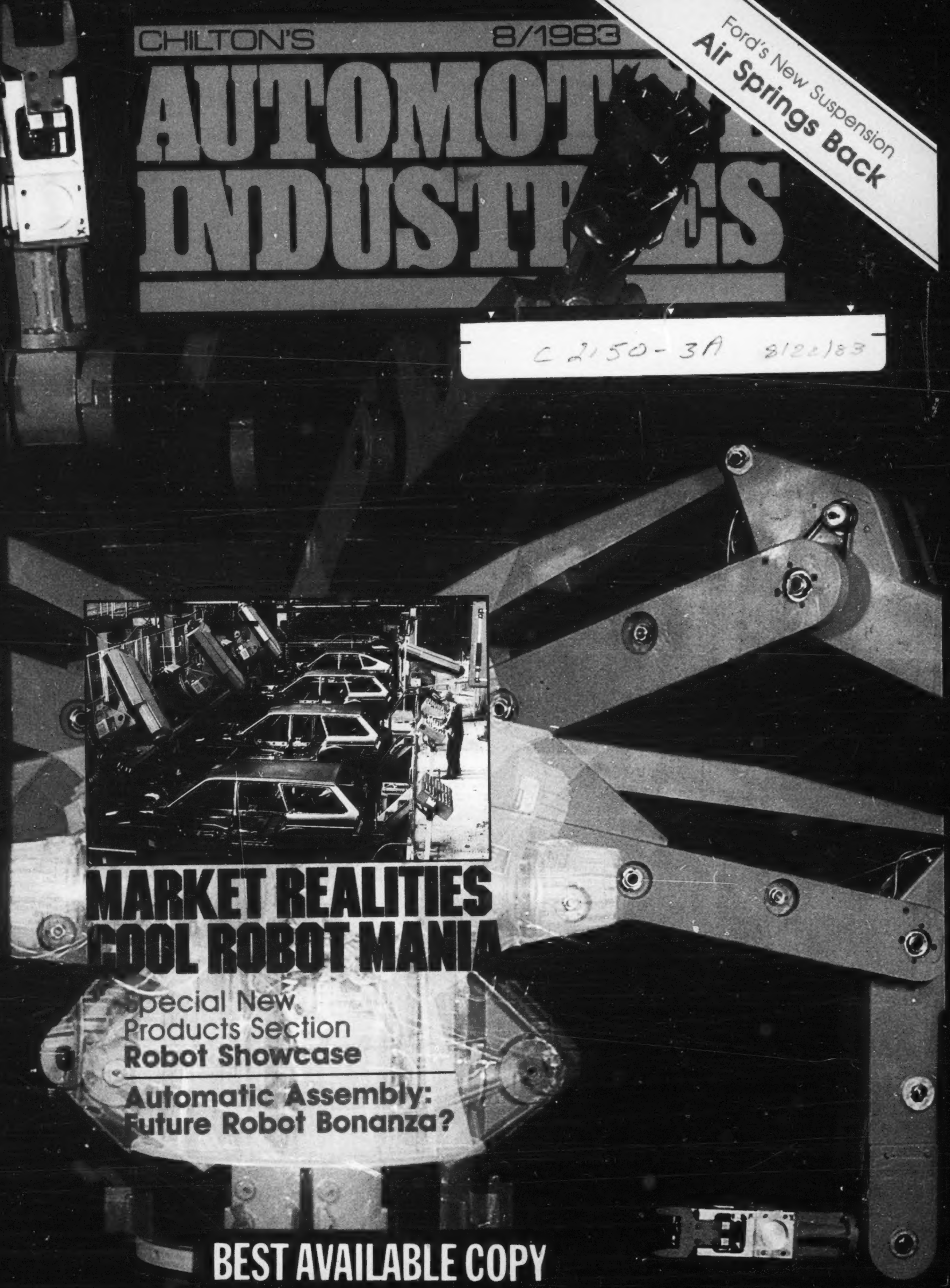
A University of Michigan report on the US automotive industry says **continuously variable transmissions will be used** in 10% of US-made cars in the 1990s. Also, lightweight materials will reduce the average weight of US-built cars from 3300 lb in 1980 to 2700 lb in '85 and 2250 lb in '90 (1496, 1224, 1020 kg). ■ Brenlin Corp. bought Firestone's **Reaction Injection Molding Div.** for an undisclosed sum. The company will be called Romeo Rim Inc. ■ Saab's 9700 world sales in March were an **all-time record** and total sales for the first quarter '83 were up 15% from '82—24,600 vs 21,500. ■ New car **sales in Great Britain** for May were up 20% over last year, and sales for the first five months of '83 were up 17.2% over '82.

CHILTON'S 8/1983

AUTOMOTIVE INDUSTRIES

Ford's New Suspension
Air Springs Back

C 2150-3A 8/22/83



MARKET REALITIES COOL ROBOT MANIA

Special New Products Section
Robot Showcase

Automatic Assembly: Future Robot Bonanza?

AUTOMOTIVE INDUSTRIES

August, 1983/Volume 163, Number 8

FEATURES

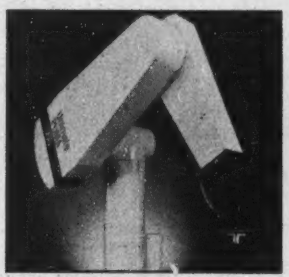
12 Market Realities Cool Robot Mania
There's definite disagreement on where the robot industry is going. It's still a growth market, but future projections vary widely.

15 Robot Showcase
The pick of the crop from a burgeoning robotics industry are presented in New Products format for your perusal.

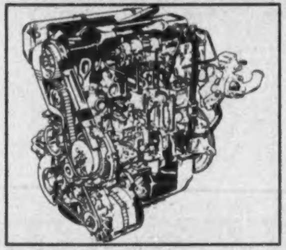
27 Automated Assembly Gains Ground
Robot makers view automotive assembly as the last bastion of labor-intensive production. In Europe, automated assembly is making progress.

34 Ford Europe Debuts Small Diesel
Ford Europe's first passenger car diesel is a state-of-the-art design.

38 Air Springs Back
The design drawbacks of 25 years ago have been surmounted, say Ford engineers, and the air spring system on the Lincoln Mk. VII is proof.



Robot Showcase—P. 15



Ford Diesel—P. 34

Automated Assembly—P. 27

Aero Headlamps—P. 8

Robert A. Lutz—P. 11

NEWS & DEPARTMENTS

7 Editorial: What's Right With The Auto Industry
8 Newsline
11 Detroit: Lutz Challenges The Japanese
40 New Products
47 Marketdata
48 Business Managers
48 Advertisers' Index
51 Reader Information Cards

COVER

Volkswagen "Robbies" perform a variety of functions for the company, from welding to gluing.

NEXT MONTH

AI's Materials Round Table brings suppliers and vehicle makers together for a "what material where" talk.

QUOTABLE

Canadian Ambassador to the US, Allan E. Gotlieb, on protectionist trade practices: "Entire industries are calling for protection from foreign competition, even though that protection undermines the solid foundation upon which our interdependent world is built. Once the cycle of protectionism begins, it is very difficult to stop. We can only expand exports if someone buys them, but if everyone is restricting imports, then there will be fewer buyers overall, not more."

AUTOMOTIVE INDUSTRIES (ISSN 0273-656x) magazine is published monthly by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription rates and single copy prices on request. Second Class Postage paid at Wayne, PA 19087 and additional mailing offices. POSTMASTER: Send address changes to AUTOMOTIVE INDUSTRIES, P.O. Box 1441, Riverton, NJ 08077. ©Chilton Company, 1983. Permission to photocopy for internal use or the internal use of specific clients is granted by Chilton Company for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $1.00 per copy of the article, plus 25¢ per page is paid directly to the CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to The Editor. (0273-656x/83 $1.00 + 25¢)

AI MARKETDATA

Auto Forecast Revised

Citicorp has lowered its 1983 second half new car annual selling rate forecast to 9.45 million—a 200,000 unit downtick from its last forecast. Citicorp economist John Maher blames the lowered target on the lack of positive effect the strong money supply growth is having on nominal and real income. Maher also postulates the voluntary Japanese import restraints may actually be hurting overall sales, citing stronger than anticipated import car demand. "In other words," Maher states, "US car buyers do not necessarily view domestically produced vehicles as close substitutes for Japanese vehicles."

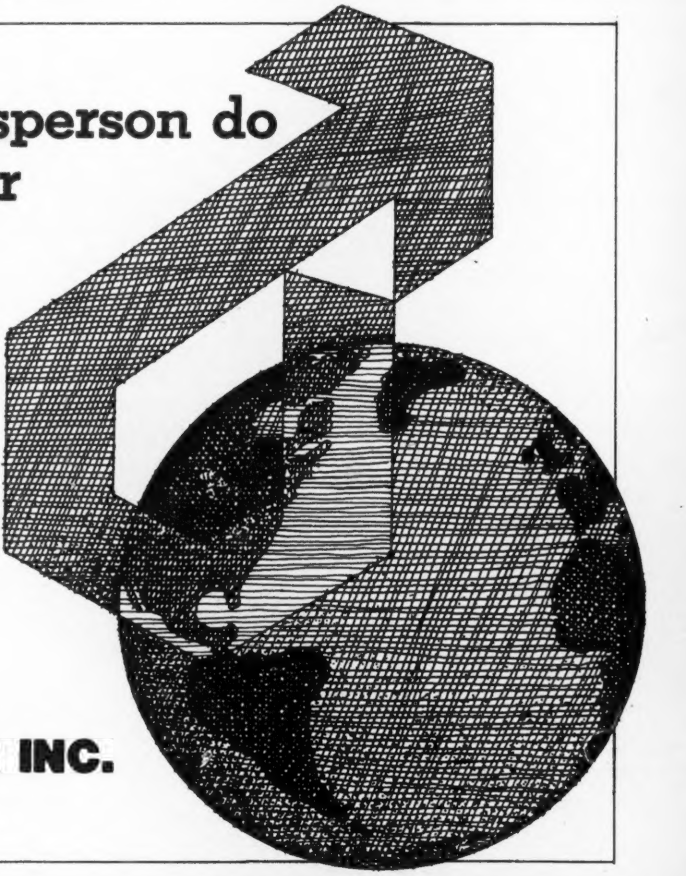
Quarterly New Auto Sales
(millions, seasonally adjusted annual rates)

	1983				1984				1985	
	1	2	3	4	1	2	3	4	1	2
Total Sales	8.4	8.7	9.3	9.6	9.9	10.3	10.6	10.8	11.0	10.8
Domestic	6.0	6.5	6.9	7.3	7.7	7.8	8.0	8.3	8.4	8.2
Imported	2.4	2.2	2.4	2.3	2.2	2.5	2.6	2.5	2.6	2.6
Import Share (%)	28.5	25.3	25.8	24.0	22.2	24.3	24.5	23.1	23.6	24.1

Source: Citibank Economics Dept

Market Minutiae

BL has ordered two $600,000 **CNC coordinate measuring machines** from LK Tool Co. to be installed at Austin Rover and Jaguar Cars Ltd. The machines automatically check complete car bodies as well as individual panels, fixtures, gauges and tooling. ■ Nissan Motor Co.'s **overseas sourcing** increased 5.9% in FY 1982, making Nissan the largest importer of automotive parts, materials and machinery in the Japanese industry. Over half of the 50.1 billion yen spent in overseas markets went to the US. ■ J. D. Power says the US turbo car could be **in for a shakeout** much like the one faced by diesels today. Too many turbos, says Power, and too much confusion as to what benefits the turbo brings.



What can one salesperson do for the world leader in collision repair equipment?

Send a resume.

It could mean using your background to best advantage if you're experienced as owner/manager or chief frame technician of a body shop, experienced in automotive capital goods sales, or have a combination of both.

Because our Blackhawk line of auto collision repair equipment is the best, we seek only the best as sales representatives. Find out if that's you by sending your resume to:

W. Wilson

APPLIED POWER INC.
AUTOMOTIVE DIVISION
P.O. Box 27207, Milwaukee, WI 53227
Equal Opportunity Employer M/F

CHILTON'S 9/1983

AUTOMOTIVE INDUSTRIES

WITH TRUCK & OFF-HIGHWAY INDUSTRIES

Included in This Issue
TRUCK & OFF-HIGHWAY INDUSTRIES
Off-Highway Show Issue

C 2150-3A 9/12/83

MATERIALS 1984

Exclusive *AI* Materials Roundtable:
Automakers Vs. Suppliers

'84 Fiero: To Be Proud, Plastic & Pontiac

AUTOMOTIVE INDUSTRIES

September, 1983/Volume 163, Number 9

FEATURES

23 Materials Roundtable—Suppliers' Vs. Automakers' Needs
AI assembles a group of top material engineers from the automakers and suppliers to voice each side's needs and problems.

33 Pontiac's Fiero—How Many Ways Can You Spell Proud?
The birdmen of Pontiac breathe life into a mid-engined two-seater that coalesces the division's design and manufacturing segments into a formidable whole.

39 Honda Goes Plastic
The Honda Ballade Sports CRX advances the use of plastic body panels. The car's injection molded panels are far cheaper to produce than those on the Corvette or Fiero, Honda claims.

42 Jeep's XJ—And Now For Something Completely Different . . .
Sleek, svelte and roomy, powered by the new AMC 2.5-L four, the XJ combines urban comfort with hellacious trail ability.

46 Nissan's Short, Sweet Six
The soon to appear Datsun 300ZX gets a 3.0-L V6 that should return some credibility to the word "awesome".

51 Steel Collar Futures
AI talks with Westinghouse's Vince Valeri on the new Westinghouse/Unimation combination and some of the finer points of hydraulic vs. electric robots.

54 New/Old Piston Gains OE Market
The headland piston design has been around for 40 years, but only now is it being used in a volume production engine.

60 Europe Works Toward The All-Plastic Body
The plastic car in Europe is still over the horizon, but the concept comes closer to reality every day.

NEWS & DEPARTMENTS

5 Editorial: Take That, You Brute!
5 Editorial & Business Staffs
9 Detroit: Giantus Maximus—GM At 75
15 Markletdata
17 Newsline
67 New Products
68 Business Managers
74 Advertisers' Index

COVER

This month's cover features the latest in rubber buggy bumpers, Pontiac's plastic fantastic Fiero.

NEXT MONTH

We look at the '84 auto hordes, chart the changes and tell who's sinking, swimming and treading water.

QUOTABLE

"That the automobile will become a feature of certain parts of Japan is reasonably sure, but at the present time the country does not seem ready for it."—*The Horseless Age,* Sept. 1908 (see pages 9-13 for other 1908 happenings).

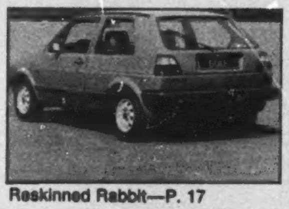
Materials Roundtable—P. 23

Pontiac Fiero—P. 33

Jeep XJ—P. 42

European Plastics—P. 60

100,000th CHEVROLET
100,000Th.
GM's 75th—P. 9


Reskinned Rabbit—P. 17

AUTOMOTIVE INDUSTRIES (ISSN 0273-656x) magazine is published monthly by Chilton Co., Chilton Way, Radnor, PA 19089. Chilton Co. is a division of American Broadcasting Companies Inc., New York, NY. Subscription rates and single copy prices on request. Second Class Postage paid at Wayne, PA 19087 and additional mailing offices. POSTMASTER: Send address changes to AUTOMOTIVE INDUSTRIES, P.O. Box 1441, Riverton, NJ 08077. ©Chilton Company, 1983. Permission to photocopy for internal use or the internal use of specific clients is granted by Chilton Company for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $1.00 per copy of the article, plus 25¢ per page is paid directly to the CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to The Editor. (0273-656x/83 $1.00 + 25¢)

AI MARKETDATA

Autometrics

Total new car sales in the US will be 9.1 million units this year, up 14% from 1982, according to an econometric model developed by Chemical Bank of New York. The domestic/import split will be 6.7/2.4 million units, increases of 16% and 9% respectively. Chemical Bank says expanding market demand coupled to bone-scraping cost cuts will notch US manufacturers into stronger financial positions through 1985. The combined breakeven point for the Big Three is now around 8.4 million units. US production of cars will be 6.5 million this year, 7.3 million in 1984 and 8.2 million in 1985, according to Chemical. New truck production will hit 2.3 million this year, 2.7 million next, and 3.0 million in 1985.

US RETAIL VEHICLE SALES
(million units)

	Passenger Cars			Trucks			
	Domestic	Imports	Total	Domestic	Imports	Total	Grand Total
1982	5.76	2.22	7.98	2.15	0.41	2.56	10.54
1983F	6.70	2.40	9.10	2.45	0.40	2.85	11.95
1984F	7.50	2.70	10.20	2.80	0.40	3.20	13.40
1985F	8.40	2.70	11.10	3.12	0.40	3.52	14.62

F-Forecast
Source: Chemical Bank

More Blue Skies

Bernstein & Co., New York, says second half '83 car sales will gain muscle due to the large number of new offerings by car makers and ever growing consumer confidence. The firm expects selling rates to continue to expand gradually, with seasonally adjusted deliveries reaching 7.0 million units in the third and 7.5 million in the fourth quarter. Bernstein says full-year '83 domestic deliveries will be 6.7 million cars. Bernstein also postulates that the Japanese voluntary import restraints will be continued, despite rumblings from Japan's new minister of international trade, through early 1985. If so, overall foreign penetration should remain at 26-27% through calendar year '84.

US Factory Sales (000 units)	**1982**	**1983E**	**1984E**	**1985-6E**
General Motors				
US Car	3,147	4,005	4,575	4,910
US Truck	895	1,142	1,300	1,400
Ford				
US Car	1,105	1,532	1,615	1,730
US Truck	714	910	975	1,070
Chrysler				
US Car	599	891	975	1,105
US Truck	123	140	200	250
AMC	227	251	340	390
VW	93	125	175	200
Honda	2	50	120	140
Nissan	—	—	20	100
	322	426	655	830

E-Estimate
Source: Sanford C. Bernstein & Co.

Eurotruck Trickle

Even though 1983 truck demand in Europe is improving modestly, it's not going to be able to offset continued steep declines in European truck export markets, according to a report from DRI Europe Ltd. In 1983, export of trucks beyond Europe will decrease by almost 30%, dragging European truck production down 10%. 1984 will see a more broadly-based recovery, but no major European truck producing countries are expected to exceed pre-recession levels until late in the decade, DRI says.

EUROPEAN PRODUCTION OF LIGHT, MEDIUM AND HEAVY TRUCKS
(000's)

	1980	1982	1983	1990
West Germany	180.9	169.9	145.3	204.1
France	61.4	44.6	42.0	61.5
United Kingdom	104.0	66.6	61.9	83.2
Italy	42.2	36.4	37.2	47.5
Spain	22.6	21.8	22.8	23.8
Sweden	55.1	49.6	46.6	62.1
Netherlands	15.9	11.0	11.3	14.9
TOTAL	482.1	399.8	367.1	497.1

Source: DRI Europe Ltd.